MOBILITY HUB GUIDELINES

For the Greater Toronto and Hamilton Area

METROLINX

An agency of the Government of Ontario

September 2011

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ACKNOWLEDGEMENTS

This document is the result of the participation and support of many people and organizations. In developing these Guidelines, we held several stakeholder workshops, which were attended by provincial ministries, GTHA municipalities and transit agencies, institutions, and other public agencies, representing a variety of disciplines such as policy and planning, urban design, transit and transportation planning, real-estate development and economic development, amongst others. Input received was very helpful in making the document more practical and useful.

Valuable direction was provided from the Internal Working Group, which included a spectrum of Metrolinx and GO Transit staff, as well as provincial representatives. Further, our consultants, led by IBI Group, provided us with multi-disciplinary and in-depth knowledge in this field. Names of the project team and Internal Working Group members are identified below.

We would like to thank everyone for their constructive feedback and input that was provided throughout this process. We look forward to continued feedback on the Guidelines and close collaboration in the planning and development of specific mobility hubs.

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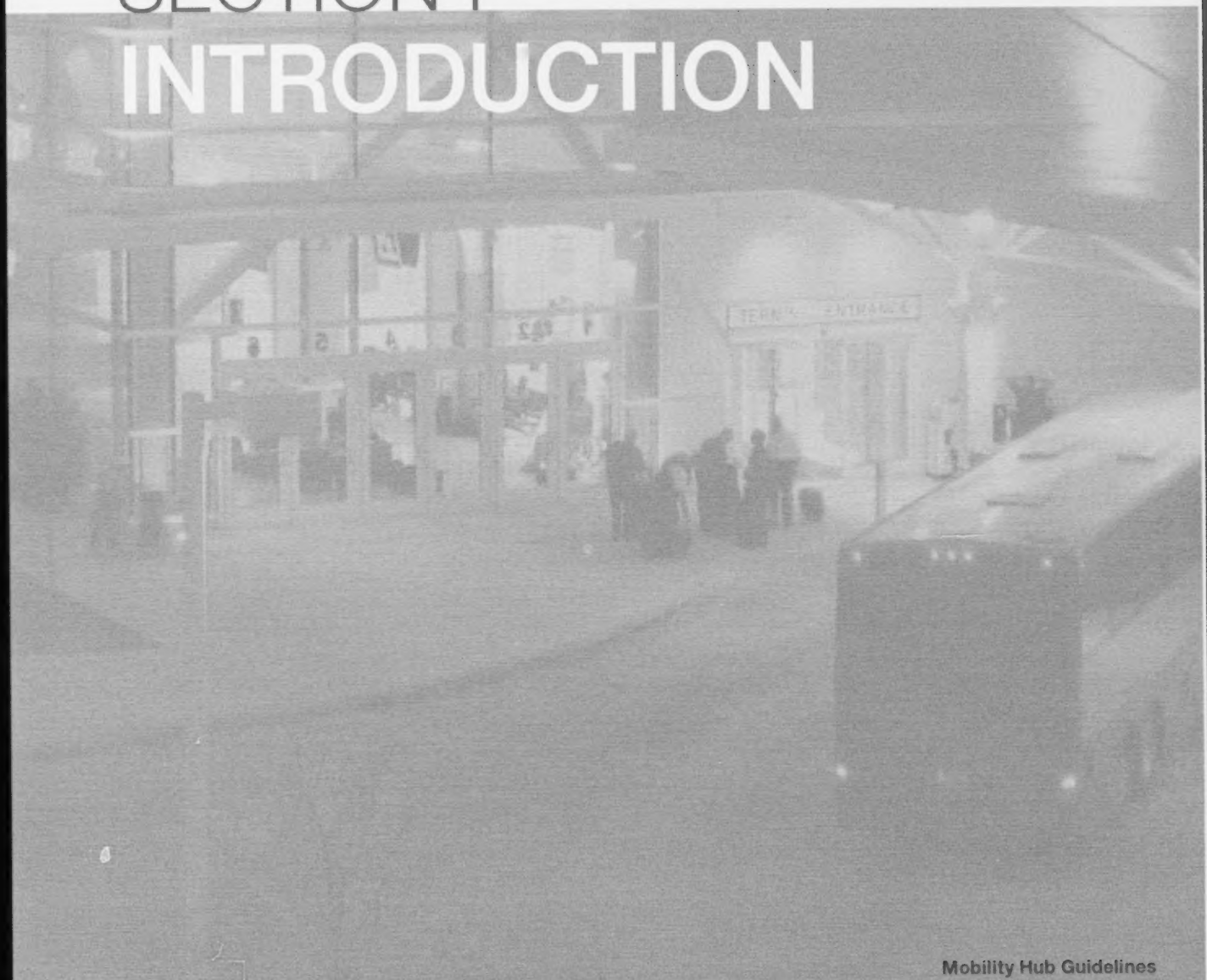
SECTION I
INTRODUCTION



INTRODUCTION

A liveable, competitive, and environmentally sustainable urban region requires fast, frequent and well-connected means of movement. An efficient and effective transit system depends on dense concentrations of trip origins and destinations. Focusing growth and development around major transit stations allows more people to live near transit services, and makes more destinations accessible by transit.

Transit stations are the key point of contact between the traveller and the transit system, so they have a significant impact on the overall travelling experience. A well designed transit station can entice travellers into the transit system and help make them feel comfortable, relaxed, informed and appreciated. A poorly-designed station can cause frustration.

The Big Move, Metrolinx's Regional Transportation Plan for the Greater Toronto and Hamilton Area (GTHA), imagines a future in which key transit stations become mobility hubs, where transportation modes, including rapid transit, local transit, specialized transit, cycling and accessible pedestrian networks come together seamlessly. Mobility hubs are locations for major destinations such as offices, hospitals, educational facilities and government services. They offer amenities to travellers such as traveller information centres, cafés or restaurants, and services like daycares, grocery stores or post offices.

Mobility hubs have great potential to help transform the region and reinforce provincial land use policies as laid out by the landmark Greenbelt Plan and Growth Plan for the Greater Golden Horseshoe. The hubs will be centres of activity, attracting opportunities to live, work, and play, all connected to the greater region through reliable, rapid transit. However, this will only happen with the successful integration of land use and transportation decision making, committed public and private sector partners, strong stakeholder engagement and a common vision for the future.

These Mobility Hub Guidelines (the Guidelines) have been prepared to guide planning and development at mobility hubs in the GTHA. The Guidelines focus on the factors that contribute to creating successful mobility hubs, and address topics such as transit station design, station circulation and access, transit customer information and wayfinding, land use and urban design surrounding rapid transit stations, and funding and implementation. For each topic, the Guidelines provide detailed strategies, best practices, case studies, and suggested resources.

Metrolinx will regularly review and update these guidelines at least every five years.

FIG I.1 Intermodal Hub in Milwaukee, WI.

FIG I.2 Bicycle station outside of Union Station, Washington, DC.

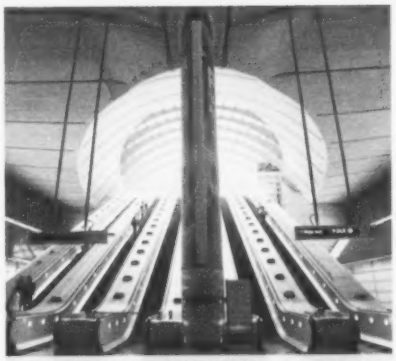


FIG I.3 Canary Wharf Station in London, UK.

I.I WHAT IS A MOBILITY HUB?

A mobility hub is more than just a transit station. Mobility hubs consist of major transit stations and the surrounding area. They serve a critical function in the regional transportation system as the origin, destination, or transfer point for a significant portion of trips. They are places of connectivity where different modes of transportation – from walking to riding transit – come together seamlessly and where there is an intensive concentration of working, living, shopping and/or playing.

The key elements of a successful mobility hub are illustrated in Figure i.6.

Mobility hubs vary in size, but generally comprise the transit station and surrounding area that can be comfortably accessed by foot, approximately an 800 metre radius. However, the actual hub boundary should be determined based on the specific physical characteristics, neighbourhood context, and planning framework of each site. Sections II.II and II.III provide more information on defining the mobility hub planning area.

Of the mobility hubs identified in the GTHA (see Figure i.10), there is a wide range in how far each site has currently advanced towards the mobility hub concept. Many existing sites offer little more than vast parking lots, while others are easily accessible by many modes and are already vibrant places of activity and destinations in themselves.

FIG I.4 Stratford Station in London, UK demonstrates a well laid out, seamless transportation interchange.

FIG I.5 High density, mixed use development: Portico, Vancouver.

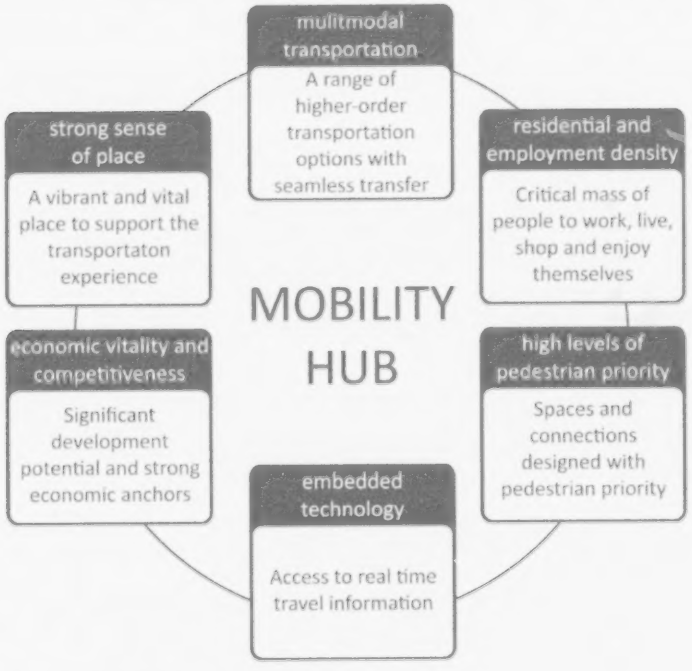

mulitmodal transportation
A range of higher-order transportation options with seamless transfer
strong sense of place
A vibrant and vital place to support the transportaton experience
residential and employment density
Critical mass of people to work, live, shop and enjoy themselves
MOBILITY HUB
economic vitality and competitiveness
Significant development potential and strong economic anchors
high levels of pedestrian priority
Spaces and connections designed with pedestrian priority
embedded technology
Access to real time travel information

FIG I.6 Elements of a mobility hub

I.II PURPOSE OF THE MOBILITY HUB GUIDELINES

Purpose

The purpose of the Mobility Hub Guidelines is to:

1) Clearly communicate the mobility hub concept including objectives, characteristics, and the role of hubs in the region.

2) Provide guidance and inspiration on developing mobility hub plans and incorporating mobility hub objectives into other planning activities (e.g., official plans, secondary plans, station plans and environmental assessments).

3) Become a tool and resource for Metrolinx/GO Transit, municipalities, transit agencies, developers, consultants, provincial ministries, community organizations and other public agencies.

4) Serve as a key source of direction for Metrolinx when undertaking planning efforts, building or funding infrastructure in mobility hubs, or reviewing third party plans and proposals for mobility hubs.

Even though the scale and context of this material is focused on mobility hubs, this document can also be used beyond the planning and implementation of mobility hubs, in planning for other areas in a transit supportive manner.

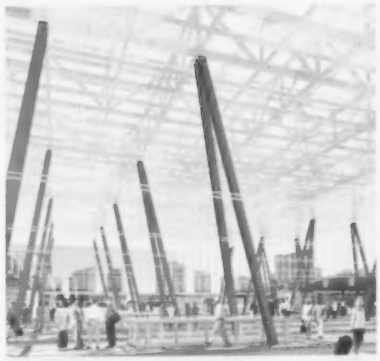


FIG I.7 The future Union Station in Toronto.

FIG I.8 Market Common mixed-use urban village development in the Clarendon station area encourages people to use transit. Arlington, Virginia.

Intended Audience

The primary audience for these guidelines includes Metrolinx/GO Transit staff, municipal land use and transportation planners, transit operators, major institutions, and provincial ministries and agencies that engage in land use and transportation planning activities. The Guidelines are also intended to serve as a guide for private agents who are planning, developing, and investing in any of the identified hubs.

In addition, these guidelines will serve as a key source of direction for Metrolinx when undertaking planning efforts or when building or funding infrastructure in any of the identified mobility hubs. They will also serve as a tool when reviewing third party plans and proposals for mobility hubs. The ultimate goal is that all planning activities and infrastructure projects around mobility hubs will help realize the direction of the Big Move to develop a system of connected mobility hubs.

Relation to Provincial Policies

It is not the intent of this document to create new policies, a new planning process, or additional requirements for municipalities. The Mobility Hub Guidelines are guidelines to help implement existing policies and directions. They are intended to be a useful tool to elucidate the mobility hub concept and provide direction on how to move toward its successful implementation.

The Guidelines do not supersede municipal plans, including official plans, and are not to be interpreted by planners or the Ontario Municipal Board as prevailing over municipal plans. Where there is a conflict between the Growth Plan for the Greater Golden Horseshoe and the Guidelines, the Growth Plan will prevail.

I.III MOBILITY HUBS AND THE BIG MOVE

The Growth Plan defines major transit station areas as the area within an approximately 10 minute walk of any existing or planned higher order transit station within a settlement area or around a major bus depot in an urban core. Major transit station areas that are particularly significant for the regional rapid transit system are recognized as mobility hubs in the Big Move.

The Big Move identifies two kinds of mobility hubs:

- **Anchor hubs** have the potential to transform the regional urban structure and act as anchors in the regional transportation system. They include the major transit station area and the surrounding area in urban growth centres as well as Pearson Airport and Union Station due to their roles as the GTHA's primary international gateways.
- **Gateway hubs** are also key nodes in the regional transportation system located where two or more current or planned regional rapid transit lines intersect and where there is expected to be significant passenger activity (4,500 or more forecasted combined boardings and alightings in 2031 in the morning peak period). In addition, these areas are generally forecasted to achieve or have the potential to achieve a minimum density target of approximately 50 residents and jobs combined per hectare.

While The Big Move identifies specific mobility hubs (see Figure i.10), there are many other nodes that are also important components of the region's urban structure and transportation system. These include:

- **Destinations** are unique places within the region that have significant drawing power. Although without the transit activity to be full mobility hubs, such destinations are critical to the functioning of the transportation system. Destinations include universities, colleges, airports, regional shopping centres, hospitals, arenas, and arts centres.
- **Major transit station areas** that do not meet the criteria for mobility hubs continue to be locally significant access points to, or interchanges within, the transportation system. As such, they must provide convenient access from various forms of transportation.

FIG i.9 The Big Move, Mobility Hubs, Destinations, and Major Transit.

For additional information on the Big Move directions for mobility hubs, see the Big Move, Strategy #7 and the Mobility Hubs Backgrounder at www.metrolinx.com.

Mobility Hubs in the Greater Toronto and Hamilton Area

FIG I.10 Mobility Hubs as identified in The Big Move, November 2008.

I.IV PLANNING CONTEXT

The provincial government and many municipalities have developed a significant amount of material to aid and direct the implementation of land use, transportation, and growth management policies in the region. The Mobility Hub Guidelines recognize this work and were developed in this context.

The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area
In November 2008, the Metrolinx Board adopted the Regional Transportation Plan for the GTHA, entitled The Big Move: Transforming Transportation in the GTHA. The Big Move is a long-term strategic plan for an integrated, multi-modal, regional transportation system. It introduces actions and policies that will influence almost every aspect of transportation decision making in the region. It builds on the direction and policies set out in the Greenbelt Plan (2005) and the Growth Plan for the Greater Golden Horseshoe (2006). A priority action of the Big Move (Big Move #7) is to create a system of connected mobility hubs.

The Big Move identifies a number of hubs that have special importance due to their location within or in close proximity to an Urban Growth Centre (UGC), as defined by the Growth Plan. Similarly to UGC policies, mobility hubs are affected by policies in the Growth Plan that refer to Major Transit Station Areas and Intensification Corridors. Section II.IV explains the relationship between mobility hubs and the Growth Plan in more detail.

Transit Supportive Guidelines
The Transit Supportive Guidelines developed by the Ontario Ministry of Transportation offer suggestions and advice for planning transit-supportive communities across the province. The content of the Transit Supportive Guidelines and the Mobility Hub Guidelines is mutually supportive; however, the documents serve different purposes.

The Transit Supportive Guidelines are province-wide in scope, and provide strategies related to transit-supportive planning, design and best practices in transit operations, and ridership growth strategies for implementation across communities of all sizes. By contrast, the Mobility Hub Guidelines were developed to provide specific guidance to those unique places within the GTHA transportation network identified as mobility hubs. The Guidelines attend to the differences among the 51 identified mobility hubs and the challenges presented for planning at their specific geographic scale.

Municipal Initiatives
Many municipalities are already well on their way to implementing some of the objectives and approaches outlined here within mobility hubs and other areas. The Guidelines are intended to support this work with specific strategies and examples that can be implemented as part of existing plans.

Examples of related municipal initiatives include:
- Official Plans: Livable Oakville (Midtown Oakville Growth Area)
- Secondary Plans: Markham Centre Secondary Plan, York University Secondary Plan
- Guidelines: Transit Oriented Development Guidelines for Hamilton
- Other Studies: Mississauga Downtown 21 Master Plan, Downtown Oshawa Action Plan, Bloor Lansdowne Avenue Study, City of Mississauga Downtown 21 Master Plan; and City of Toronto Avenue Studies and Secondary Plans.

I.V HOW TO USE THE MOBILITY HUB GUIDELINES

Within a mobility hub there exists a tension between the *transportation function* - the need for quick and efficient movement – and the *placemaking function* – the elements that make the hub a desirable and interesting destination, rather than just a node to pass through. The ability of a mobility hub to function successfully depends on the interaction and balance of these two functions. Added to this, is the challenge of making it all happen.

Reflecting these challenges, the Mobility Hub Guidelines are organized under the three categories of **(1) Seamless Mobility**, **(2) Placemaking**, and **(3) Successful Implementation**. Specific objectives follow under each of the categories as shown below.

MOBILITY HUB **OBJECTIVES**

SEAMLESS MOBILITY

Seamless integration of modes at the rapid transit station.

Safe and efficient movement of people with high levels of pedestrian priority.

A well-designed transit station for a high quality user experience.

Strategic parking management.

PLACEMAKING

A vibrant, mixed-use environment with higher land use intensity.

An attractive public realm.

SUCCESSFUL IMPLEMENTATION

A minimized ecological footprint.

Flexible planning to accommodate growth and change.

Effective partnerships and incentives for increased public and private investment.

For each of the nine objectives, a series of guidelines and examples are provided. A simple graphical format is followed throughout the document, as shown in Figure i.11 below.

Each Guideline contains a Benefits, Applicability, Toolbox and Approaches section and is supported with case studies and best practice examples. Each guideline is also identified for its applicability to all or parts of the mobility hub area and to different mobility hub typologies (see Section II for more information on mobility hub typologies and zones). Note that transportation/urban form typologies are only indicated when a strategy is particularly applicable to certain types of hubs.

Layout of the Mobility Hub Guidelines

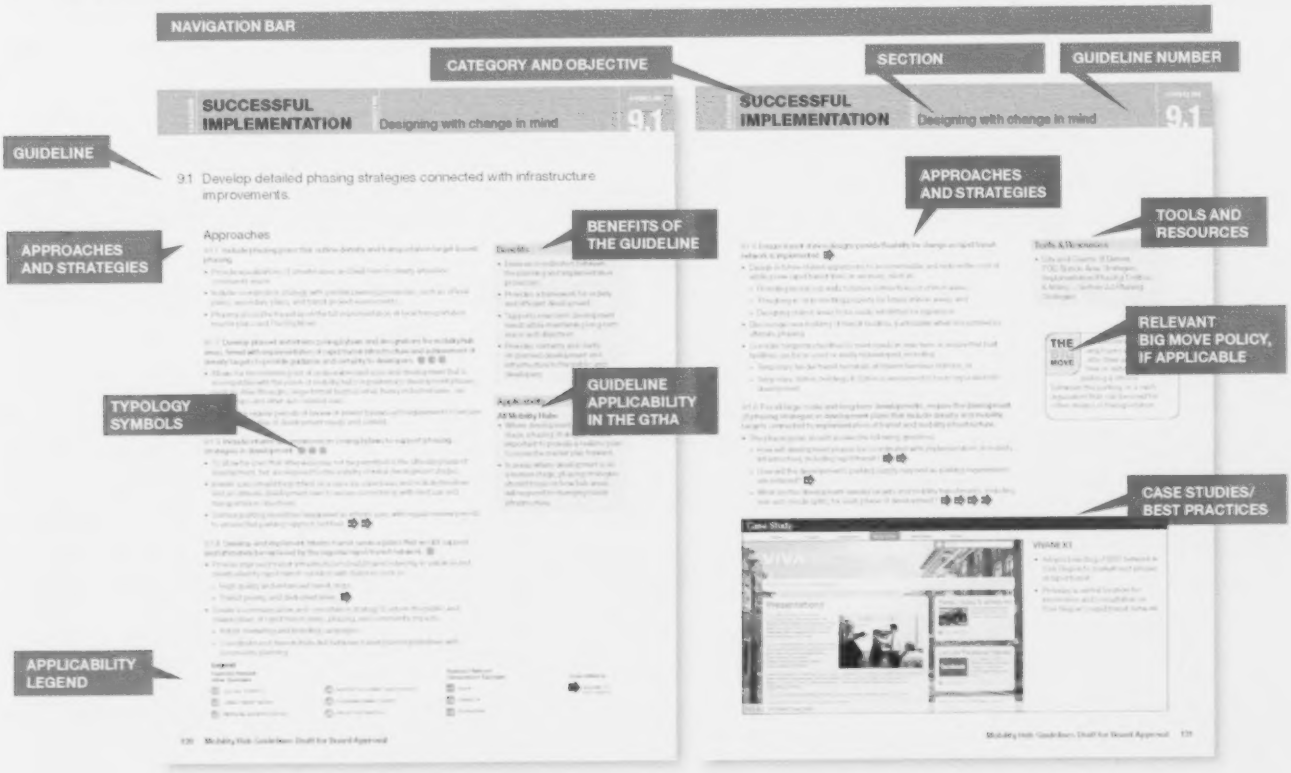
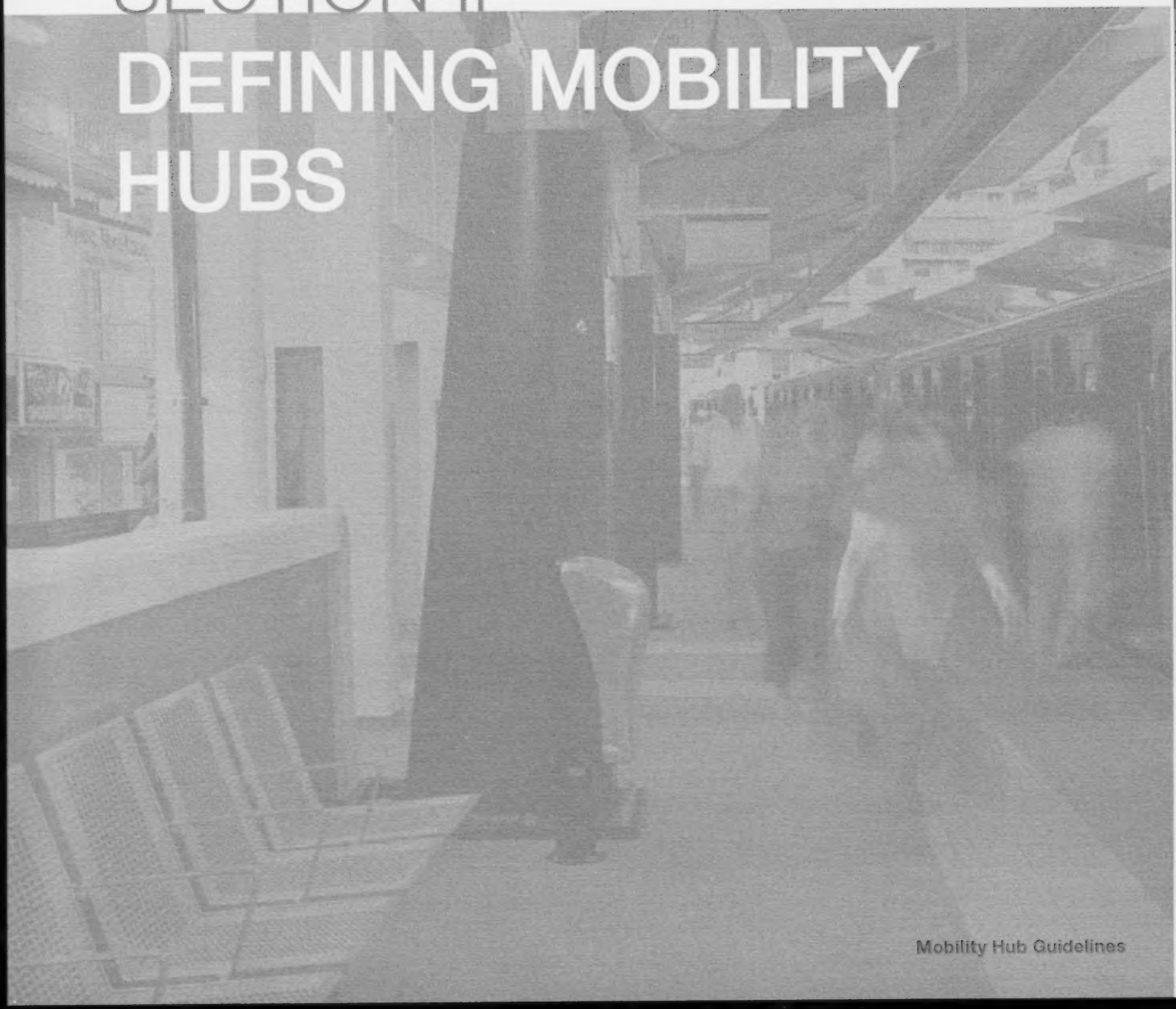


FIG I.11 Sample layout of the Mobility Hub Guidelines.

SECTION II
DEFINING MOBILITY HUBS



II.I MOBILITY HUB TYPOLOGY

These Guidelines recognize that there cannot be a "one-size-fits-all" approach for planning and developing mobility hubs. Each location presents unique challenges and opportunities based on its urban context (e.g., urban vs. suburban), transportation function and level of development towards the mobility hub concept. Many identified station areas offer little more than vast parking lots, while others are easily accessible by many modes and are already vibrant places of activity and destinations in themselves.

A mobility hub typology is established to address the key differences between the mobility hubs. It is separated into two categories: urban context and transportation function, as illustrated in Table ii.1. Each mobility hub can be classified under both the urban context and transportation function typology. For example, North York Centre would fall under the Urban Transit Node and Destination typologies.

FIG ii.1 Liverpool Street Station in London, UK.

TABLE ii.1 Mobility Hub Typology Categories

Urban Context
U1 Central Toronto
U2 Urban Transit Nodes
U3 Emerging Urban Growth Centres
U4 Historic Suburban Town Centres
U5 Suburban Transit Nodes
U6 Unique Destinations
Transportation Function
T1 Entry
T2 Transfer
T3 Destination

Note: See page 14 and 15 for a description of each type.

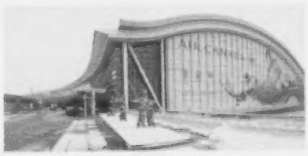
FIG ii.2 Gare l'Ouest in Brussels bus and light-rail platform.

FIG ii.3 Parceled sections of parking separated by pedestrian walkways.

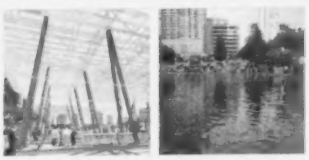
These typologies are used to tailor the application of individual strategies in Section 3, and are indicated as such where appropriate.

For example, appropriate intensification strategies at an Urban Transit Node (e.g. Dundas West/Bloor) may be very different from those at an Emerging Urban Growth Centre (e.g. Downtown Pickering). Similarly, successful approaches to transit station design depend on the types of transit service provided, the main traveller movements and how users access the station. The design focus for a transit station that acts as a main entry point into the rapid transit network will be different from one that serves as a key transfer point between rapid transit lines.

Mobility Hub Typology – Urban Context

URBAN TYPOLOGY		EXAMPLES	DESCRIPTION
u1	**Central Toronto**	• Union • Bloor – Yonge	• Regional centre with mature mix and scale of development, multiple destinations, and high densities. • Limited developable land availability. Development opportunities primarily through infill. • Good pedestrian environment with well connected, walkable street network.
u2	**Urban Transit Nodes**	• Kipling • Kennedy	• Major and local centres with a mix of uses and moderate to high densities. • Some developable land availability. Development opportunities primarily through infill.
u3	**Emerging Urban Growth Centres**	• Markham • Midtown Oakville	• Significant developable land available and high development potential. • Existing development forms and transportation network generally auto oriented.
u4	**Historic Suburban Town Centres**	• Port Credit Village • Downtown Burlington	• Town/smaller city centres with low-medium density development • Mix of uses with some destinations • Walkable street network with smaller block sizes. • Includes some Urban Growth Centres.
u5	**Suburban Transit Nodes**	• Hurontario – Steeles • Don Mills – Steeles	• Some destinations with auto-oriented urban form • Good land availability for development • Growing market for mixed use development
u6	**Unique Destinations**	 • Pearson Airport • York University/Steeles West	• Universities, Colleges, Airports in varying urban contexts. • Large trip generators.

Mobility Hub Typology – Transportation Function

TRANSPORTATION TYPOLOGY		EXAMPLES	DESCRIPTION
T1	**Entry**	 • Fairview GO • Downtown Milton	• High proportion of outbound trips in the morning peak • Typical amenities include local transit terminals, commuter parking, and bicycle parking and related facilities • Design should address station access requirements and large activity peaks during rush hour
T2	**Transfer**	 • Kennedy • Etobicoke Centre	• Major transfer point in the regional rapid transit network with transfer between two or more rapid transit lines and other transit services • Often connect multiple transit operators • Large portion of traveller activity within this hub consists of traveller movements within the rapid transit station(s) • Design should focus on ensuring seamless transfer between lines
T3	**Destination**	 • Union Station • North York Centre	• Major destination in the regional rapid transit network with concentration of employment, recreation, and institutional uses • Typically served by a high number of rapid transit lines • High proportion of inbound trips in the morning peak, with potential to achieve a greater inbound/outbound balance • Design of these hubs should address the destinations served with a greater focus on walking connections to and from the hub (e.g., the PATH network)

II.II MOBILITY HUB ZONES

Within a mobility hub, the transportation and land use conditions and opportunities typically vary as one moves farther from the transit station. For example, direct and safe walking connections are most important in close proximity to the station, where there is often the highest levels of pedestrian activity. Farther away from the station, transit, bicycle, and auto connections become relatively more important to ensure convenient station access.

When planning in a mobility hub, it is often valuable to divide the area into zones to scope the planning exercise and understand the needs and opportunities in each area. Four zones are identified, as characterized in the following table and figure. They include the primary zone, secondary zone, tertiary zone and catchment area.

While approximate boundaries are suggested, these zones are highly context sensitive and will depend on existing land use, type of transit services offered, and the presence of nearby activity centres. Section II.III outlines key factors to consider when determining a mobility hub planning area.

Where appropriate, these zones are referenced in the 'Applicability' section of each guideline (Section 3) to identify the areas where particular strategies are most applicable.

FIG ii.4 Mobility hub zones

TABLE ii.2 Mobility Hub Zones

Mobility Hub Zone	Transportation Considerations	Land Use Considerations
Primary Zone Includes the rapid transit station and associated facilities (e.g., parking) as well as the immediate surrounding area, approximately a 250 metre/2.5 minute walk radius. This area is most influenced by the high level of accessibility offered by the rapid transit services at the station.	• Transit station and nearby access routes are typically the most hectic from a transportation perspective. • Zone must prioritize high levels of pedestrian and transferring activity, while adequately balancing multiple modes of access to the station.	• Highest intensity and greatest mix of uses should typically be encouraged within this zone to encourage high levels of transit use and provide a mixed-use, vibrant activity node for the local community. • Opportunity to provide traveller amenities through development in this zone (e.g., internal pedestrian pathways, retail, shared commuter parking).
Secondary Zone Extends from the primary zone to approximately 500 metres from the rapid transit station. This zone typically provides many opportunities for transit –oriented development.	• Direct and safe walking and cycling connections to the rapid transit station and within this zone are critical.	• Typically includes relatively high densities and mix of uses to benefit from the high level of transit accessibility and promote higher sustainable mode shares.
Tertiary Zone This zone extends beyond approximately 500 metres from the rapid transit station. It is the transition from the mobility hub to the broader area outside of the hub.	• Direct and safe walking and cycling connections from this zone to the rapid transit station are still critical, although cycling and local transit feeder services will play a larger role in this area as walking distances increase.	• The density and height of development should be stepped down gradually toward the periphery of the mobility hub.
Catchment Area Includes the broader area of influence outside of the hub. Most travellers who access the regional rapid transit system through the hub will come from the catchment area. The size of this area will vary based on two key features: 1) The type of transit service. Regional rail, for example, tends to draw riders from a larger area than LRT. 2) The location and function of the hub within the regional transit system. For example, terminus stations, such as Kipling or Milton, tend to draw riders from farther distances. While mobility hubs located nearby a number of other rapid transit stations or parallel services will have smaller catchment areas	• Emphasis should be on direct and quick connections to the rapid transit station and other destinations within the mobility hub. Key access modes include bicycle, transit, and auto.	• Limited applicability to land use.

II.III DEFINING THE MOBILITY HUB PLANNING AREA

When conducting planning for a specific hub, a key first step is to establish the planning area (i.e. study area) to be considered. The Big Move broadly defines the geographic scope of a mobility hub to be an area within a 10 minute walk or within an 800 metre radius around identified regional rapid transit stations. However, the planning area should be more carefully determined based on local context for individual hubs. Local physical features and the policy and planning framework should both be considered.

Physical features

Practical Walking Routes

The planning area should include a reasonable walking distance around the transit station. While 800m or a 10 minute walk is commonly used as an acceptable walking threshold, the distance used should ideally reflect practical walking routes which take into account barriers, streets and block network, natural features, and the walking experience. Studies show that people are willing to walk longer distances to reach a transit station in a pedestrian friendly public realm.

Existing Environmental Features

Features to be considered include greenbelts, designated open space networks, and trails, environmentally sensitive areas (ESAs), and Areas of Natural or Scientific Interest (ANSIs).

Infrastructure Barriers

Barriers such as freeways, hydro corridors, and rail corridors, in some cases, define community boundaries that may be appropriate in defining mobility hub planning areas. Alternatively, a focus of the mobility hub may be to develop strategies to overcome such barriers.

Defining the Planning Area for a Hypothetical Mobility Hub

RAPID TRANSIT STATION
MAIN RETAIL / MIXED USE / TRANSIT STREETS
PRELIMINARY MOBILITY HUB BOUNDARY
RAPID TRANSIT STATION
INFRASTRUCTURE CORRIDOR
GREEN BELTS/ OPEN SPACE
REVISED MOBILITY HUB BOUNDARY AFTER CONTEXT ANALYSIS

A. Base case mobility hub boundary.

The 800m/10 min walking circle from the transit station is used as a preliminary guide for the mobility hub boundary.

In this case, the rapid transit station is planned at the intersection of two main streets which have potential for high density mixed uses and urban infill.

B. Boundary after accounting for environmental features & barriers.

The boundary is remapped to incorporate natural systems, greenways, and open space, while considering the effects of barriers such as rail and hydro corridors.

Relation of the mobility hub planning area to other planning areas and policies

The mobility hub planning area should be sensitive to boundaries established under existing plans, including Secondary Plans, Community Improvement Plans, local and regional Official Plan designations, and Corridor Studies.

The Growth Plan for the Greater Golden Horseshoe contains planning legislation, which is particularly relevant to identifying mobility hub planning areas. Over a third of the identified mobility hubs are within or in close proximity to Urban Growth Centres (UGCs), as defined in the Growth Plan. UGCs are defined as areas that will accommodate a significant share of the employment and population growth, support major transit infrastructure and provide region-wide public services as well as commercial, recreational, and entertainment uses.

Three cases have been identified where mobility hub and UGC boundaries overlap: (1) UGC within the mobility hub, (2) mobility hub partially overlaps with the UGC and (3) multiple mobility hubs within the UGC. The figures on the adjacent page illustrate these scenarios and some of the necessary considerations for defining the mobility hub planning area in these cases.

Existing land use types

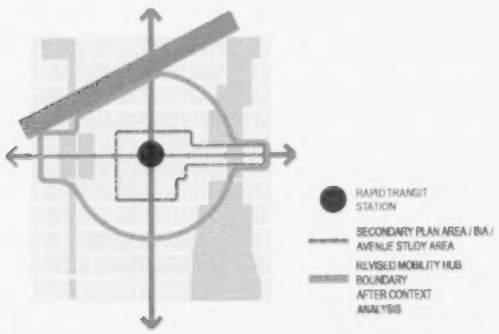
Development Areas vs. Stable Neighbourhoods

Among the 51 identified mobility hubs, some sites are more appropriate than others for infill, urbanization and densification. Brownfields or large underutilized industrial lots typically offer better potential for development into mixed-use neighbourhoods or employment areas compared to sites in well-established communities. When planning for a mobility hub near a stable neighbourhood, care should be taken to ensure the seamless integration and sensitive transition between the new transportation infrastructure, any new higher density development, and the existing community.

Regional Destinations

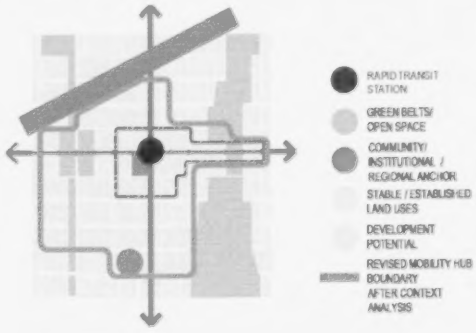
Nearby regional destinations, such as universities, colleges, regional shopping centres, hospitals, arenas and arts centres should be considered for incorporation into the mobility hub planning area, even if they are outside of the initial 800 metre radius. These destinations have the potential to attract transit ridership as well as contribute to the sense of place within the mobility hub.

Defining the Planning Area for a Hypothetical Mobility Hub


RAPID TRANSIT STATION
SECONDARY PLAN AREA / BIA / AVENUE STUDY AREA
REVISED MOBILITY HUB BOUNDARY AFTER CONTEXT ANALYSIS

C. Boundary after accounting for the legislative, policy and planning framework.

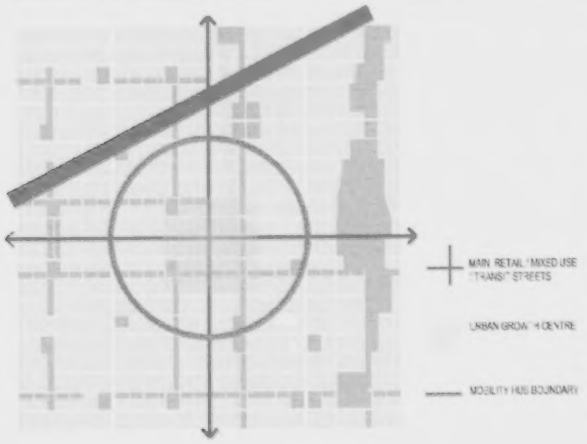
The boundary is modified to include development boundaries established under existing municipal planning processes such as official plans, secondary plans, avenue studies, community improvement plans, etc.


RAPID TRANSIT STATION
GREEN BELTS/ OPEN SPACE
COMMUNITY/ INSTITUTIONAL / REGIONAL ANCHOR
STABLE / ESTABLISHED LAND USES
DEVELOPMENT POTENTIAL
REVISED MOBILITY HUB BOUNDARY AFTER CONTEXT ANALYSIS

D. Boundary after accounting for existing land use type.

The boundary is further modified to include sites with development and intensification potential. Similarly, nearby community features and regional destinations are included in the mobility hub boundary as they have significant potential to attract ridership and contribute to the character of the hub.

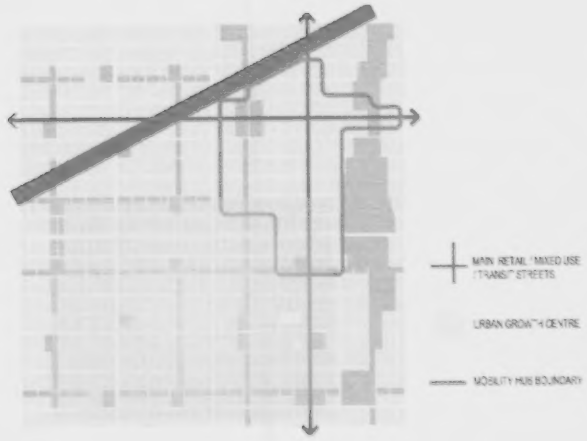
Overlapping Mobility Hub and Urban Growth Centre Boundaries: Three Cases



UGC Within: Urban Growth Centre completely Within the Mobility Hub

Under this scenario, municipalities should undertake a coordinated and integrated approach to growth management, transit planning and infrastructure delivery.

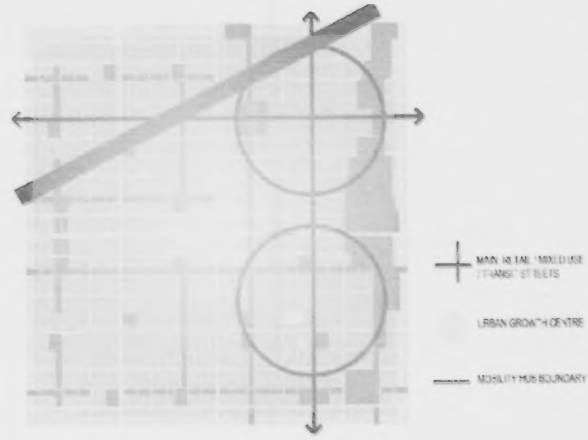
UGC density targets must be met as a first priority in Mobility Hubs. Wherever possible, the mobility hub should contain the highest development densities and the greatest land-use mixes in the mobility hub.



Partial Overlap: Mobility Hub Partially Overlaps with the Urban Growth Centre boundary

Where the mobility hub boundary partially overlaps with the UGC boundary, priority must be given to achieving the UGC density target.

Municipalities should ensure smoother transition between the height and scale of built form and a compatible physical and land use relationship between the UGC land use designations and those of the mobility hub. The built form should be oriented to provide the most direct and comfortable pedestrian, cycling and transit access from the UGC to the transit station.



Multiple Mobility Hubs Within: Several Mobility Hubs Within the Urban Growth Centre Boundary

Under this scenario, municipalities should undertake a coordinated and integrated approach to growth management, transit planning and infrastructure delivery by undertaking an urban growth centre development plan as opposed to a separate mobility hub planning process for each mobility hub.

Case Study

IDENTIFYING THE MOBILITY HUB PLANNING AREA AND ZONES

DUNDAS WEST-BLOOR MOBILITY HUB STUDY IN TORONTO, ONTARIO

The Dundas West-Bloor Mobility Hub Study was initiated in response to a number of initiatives, including:

- Planned improvements to GO Transit service, including a proposed new track and extended platform.
- The construction of an Air Rail Link stop on Metrolinx's Georgetown rail corridor.
- An exploration of ways to enhance connections between these major modes of transportation.

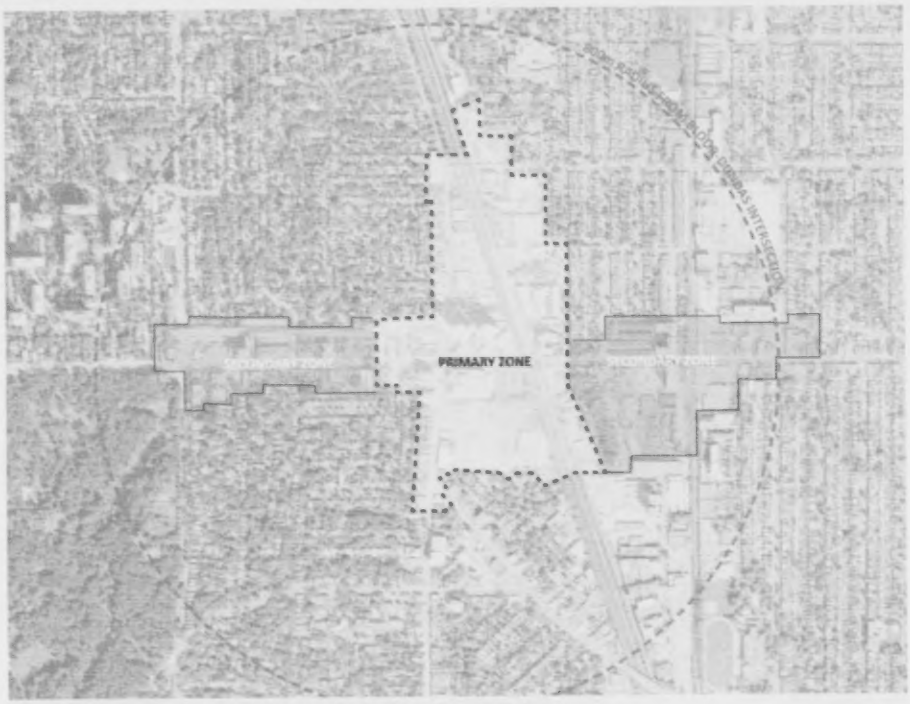


FIG II.5 Dundas West-Bloor mobility hub planning area, Toronto, Ontario.

The study identified the mobility hub zone as an area with an 800m radius from the Bloor Street West and Dundas Street West intersection. Within this area, the study further identified and focused on three zones:

- The Primary Zone - the area with greatest potential for improved connections between the various modes of transportation. The highest intensity and greatest mix of uses are encouraged within this area. The zone was determined by identifying development sites within close proximity of the rapid transit stations for which the implementation of design concepts could act as a catalyst towards achieving the mobility hub vision.
- The Secondary Zone - study recommendations include improved transit connectivity, façade improvements, and streetscape enhancements. The secondary zone was determined by examining the findings of the City of Toronto Bloor-Lansdowne and Bloor-Dundas Avenue Studies, official plan land use designations and zoning documents to identify areas that would benefit most from a community framework and urban design guidelines.
- The Tertiary Zone - the transition zone from the mobility hub to the broader context area, consisting of primarily stable residential neighbourhoods which will be subject to little change. The tertiary zone was determined by identifying primarily stable residential neighbourhoods where direct and safe walking and cycling connections and local transit feeder services are critical and redevelopment opportunities are limited.

II.IV SUGGESTED DENSITY AND MODE SHARE TARGETS

An efficient and cost-effective transit system requires nodes (or dense concentrations) of trip origins and destinations. The interface between urban form and the transportation system is particularly important around major transit stations. Focusing growth and development around major transit stations allows more people to live near transit services, and makes more destinations accessible by transit.

To reinforce the need for density around rapid transit infrastructure and guide planning in these areas, Table ii.3 presents suggested transit supportive densities within mobility hubs based on the level of rapid transit provided. Suggested transit mode share targets are also provided. The suggested transit supportive densities and mode shares are based upon existing research on the connection between transit, land use and mode shares.

Relation to Density Targets in the Growth Plan for the Greater Golden Horseshoe

The Provincial Growth Plan for the Greater Golden Horseshoe contains several policies of relevance to mobility hubs and density targets. Over a third of the identified mobility hubs are within or in close proximity to Urban Growth Centres, as defined in the Growth Plan. The Growth Plan establishes specific density targets for each of the UGCs identified. The suggested land use densities in Table ii.3 represent densities that are supportive of very highly serviced stations, where multiple rapid transit lines intersect, and where there is a high level of local transit service. However, when the mobility hub is within, or in close proximity to, a UGC, the planned densities for the mobility hub should not conflict with the required minimum density targets for the UGC.

Growth Plan policies related to major transit station areas are also of relevance to mobility hubs. Major transit station areas are generally defined as the area around any existing or planned higher order transit station. The mobility hubs identified in the Big Move are all a type of major transit station area. Hence, all Growth Plan policies for major transit station areas are applicable to mobility hubs.

A key Growth Plan policy for major transit station areas is that municipalities should plan these areas with densities that support the existing and planned rapid transit infrastructure. While the Growth Plan does not provide specific direction in this regard, the suggested density thresholds for mobility hubs presented in Table ii.3 are supportive of this policy.

TABLE ii.3 Suggested Land Use Densities by Transit Technology and Transit Mode Share for Mobility Hubs.

PREDOMINANT TRANSIT MODE SERVING MOBILITY HUB (SEE NOTE)	TRANSIT SUPPORTIVE DENSITIES (RESIDENTS AND JOBS COMBINED PER HECTARE, WITHIN MOBILITY HUB)	SUGGESTED TRANSIT MODE SHARE (TRIPS ORIGINATING WITHIN MOBILITY HUB)
Subway	**250+**	**40%**
• Subways, as a transit mode, have the ability to carry the greatest number of customers. Land use targets should reflect the ridership levels needed to justify investment in subway infrastructure. • It should be noted that traditionally, land use densities along some subway lines and stations in the City of Toronto have been moderated by high volumes of feeder transit that provide a significant proportion of ridership.		
Express Rail	**150-300**	**30-60%**
• Express rail is the enhancement of regional rail services to provide high-speed, frequent and reliable long-distance travel across the region. Mobility hubs served by express rail should have land use targets that reflect the high regional level of service provided by express rail.		
Light Rail Transit (LRT)	**200-400**	**30-50%**
• Flexibility in implementation of LRT results in a greater range of applicable contexts, resulting density, and mode split targets. Targets for transit supportive densities should reflect the ultimate configuration of LRT lines. • Higher targets should be set in LRT corridors with exclusive right-of-way, such as tunnels, elevated structures, or with complete signal protection, reflecting the higher passenger capacity of these lines.		
Bus Rapid Transit (BRT)	**100-250**	**20-35%**
• Initial implementation of BRT systems can sometimes consist of buses running in mixed-traffic with transit priority at intersections and improved customer amenities. • Higher densities should be targeted for mobility hubs on BRT corridors with service on dedicated right-of-ways.		
Regional Rail	**50-200**	**10-25%**
• Expansion, as envisioned in The Big Move, includes improving service from peak-direction and period rail service to all-day, two-way service. Land use density and mode share targets should reflect the existing and planned service levels for regional rail corridors. • In most cases, regional rail attracts the majority of its riders from a large catchment area beyond the mobility hub. As a result, ridership is less sensitive to the densities within the hub.		
Bus/Streetcar	**50-150**	**10-25%**
• Bus/streetcar service is most appropriate as an access/feeder mode to higher-tier rapid transit service in mobility hubs.		

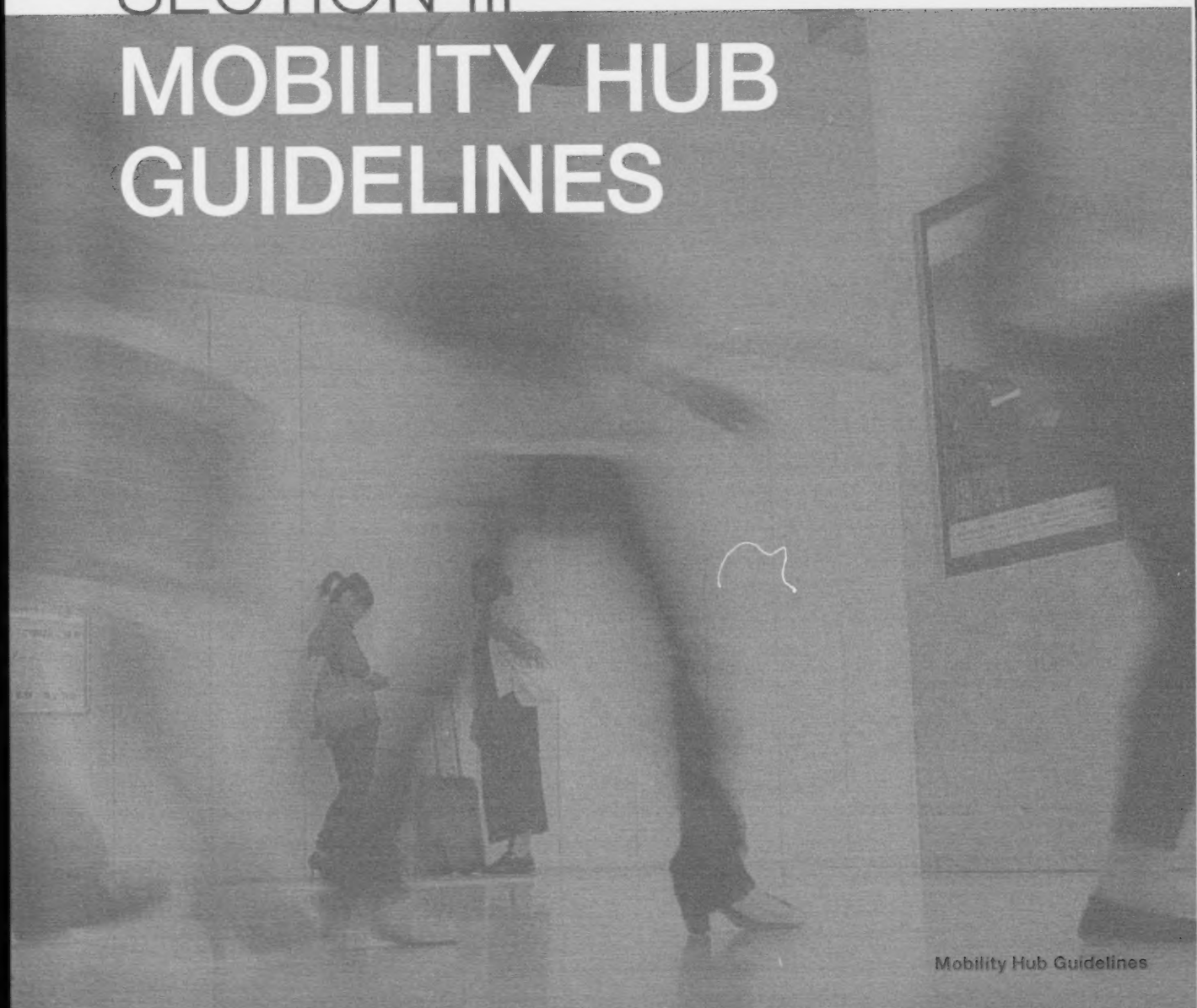
NOTES

- The transit supportive densities and suggested mode shares presented above are intended to serve as a guide and are based upon existing research on the connection between transit, land use, and mode shares. These may vary dependent on the modes of rapid transit and quality of feeder transit, land use mix and built form characteristics, and the quality of the pedestrian and cycling environment. In mobility hubs where Growth Plan targets also apply, the latter shall prevail.
- The predominant transit mode refers to the highest-order transit mode serving the mobility hub. In most cases, other rapid transit modes will be present at a mobility hub. While density targets do not compound with multiple rapid transit modes, it should be recognized that with multiple transit modes, a higher density target could be considered.
- Density ranges provided here are for guidance only. The upper portion of these ranges should not be considered as a limit.

Sources:

1 Toronto Transit Commission, Toronto Transit Commission, Rapid Transit Expansion Study, 2001
2 City of Toronto, Toronto Plan: Development and Rapid Transit Stations, March 2002.
3 Ministry of Transportation and Ministry of Municipal Affairs and Housing, Transit Supportive Land Use Guidelines, 1992.
4 Berridge et al, Study of the Reurbanisation of Metropolitan Toronto, 1991.

SECTION III
MOBILITY HUB GUIDELINES



MOBILITY HUB **OBJECTIVES, THEMES & GUIDELINES**

	OBJECTIVES	THEMES	GUIDELINES
SEAMLESS MOBILITY	Seamless integration of modes at the rapid transit station. 1	THEME ONE SEAMLESS TRANSFERS BETWEEN TRANSIT MODES, NETWORKS, AND ROUTES	1.1 Create clear, direct, and short transfers between transit modes and routes, including accessible conventional and specialized transit ..... 32 1.2 Coordinate local feeder transit service schedules and routes to provide seamless connectivity between local, regional, and rapid transit services 35
		THEME TWO BALANCED ACCESS TO AND FROM TRANSIT STATIONS	1.3 Create safe and direct pedestrian and cycling routes to rapid transit stations from major destinations and regional cycling and pedestrian networks ..... 36 1.4 Provide secure and plentiful bicycle parking at station entrances with additional cycling amenities at high volume locations ..... 37 1.5 Adopt transit priority measures to ensure the efficient movement of surface transit to and from the station area ..... 38 1.6 Provide clearly marked and protected access for pedestrians and cyclists at station areas to minimize conflicts, particularly at passenger pick-up and drop-offs (PPUDO), bus facilities, and parking access points 39
	Safe and efficient movement of people with high levels of pedestrian priority. 2	THEME ONE CLEAR MODE SHARE AND TRANSPORTATION PERFORMANCE TARGETS	2.1 Define mode share targets and other transportation performance measures to inform the development of land use and transportation planning and policy in mobility hubs ..... 42 2.2 Develop Transportation Demand Management (TDM) plans for mobility hubs and integrate development-specific travel plans into the planning approvals process 46
		THEME TWO COMPLETE AND SAFE STREETS	2.3 Build or retrofit a network of complete streets to create a balance between the movement of pedestrians, cyclists, transit, and vehicles. Adopt road design standards that ensure safe movement of all road users ..... 50 2.4 Provide an attractive pedestrian environment with a high level of priority, safety and amenities ..... 55 2.5 Create cycling-supportive streets and communities ..... 58 2.6 Adopt goods movement strategies within mobility hubs that support complete streets, while ensuring the efficient delivery of goods and services 60

	OBJECTIVES	THEMES	GUIDELINES
SEAMLESS MOBILITY	A well-designed transit station for a high quality user experience. 3	THEME ONE CREATING HIGH QUALITY TRANSIT STATIONS	3.1 Encourage high-quality station architecture and public realm that are sensitive to the surrounding built context and community vision 62
		THEME TWO VALUE-ADDED CUSTOMER AMENITIES	3.2 Develop a station retail program that is responsive to customer demand, convenience, and market needs ..... 66 3.3 Provide a high level of customer amenity to enhance customer comfort, safety, and information 67
		THEME THREE UNDERSTANDABLE STATIONS AND STATION SPACES	3.4 Create understandable and accessible transit stations through consistency and clarity in station entrances and interfaces, spaces, layout, and visual cues connected by barrier-free movement spaces ..... 69 3.5 Develop wayfinding and signage to support the efficient navigation of the transit station and station area 71
	Strategic parking management. 4	THEME ONE RIGHT-SIZING COMMUTER PARKING	4.1 Assess commuter parking needs on a corridor or system basis and locate and design parking to maximize development and ridership potential at transit stations ..... 74 4.2 Limit commuter parking expansion by prioritizing feeder transit services to mobility hub stations ..... 77 4.3 Implement commuter parking pricing with incentives for carpooling and alternative fuel vehicles 79
		THEME TWO AN AREA-BASED APPROACH TO PARKING MANAGEMENT AND REDUCTION	4.4 Develop a short and long term area-wide parking strategy with maximum and minimum parking standards and shared use parking practices ..... 80 4.5 Implement parking pricing strategies as part of an overall transportation demand management program 84
		THEME THREE PARKING DESIGNED TO HIGH STANDARDS	4.6 Minimize surface parking and integrate parking within surrounding development and parking structures ..... 85 4.7 Design parking facilities to a high level of architectural and landscape quality to reduce negative impacts on the environment and streetscape 86

PLACEMAKING

OBJECTIVES	THEMES	GUIDELINES
5 A vibrant, mixed-use environment with higher land use intensity.	THEME ONE A DYNAMIC VIBRANT AND COMPATIBLE MIX OF USES WITHIN WALKING DISTANCE OF TRANSIT	5.1 Provide a diverse mix of uses, including employment, housing, regional attractions and public spaces to create a high quality urban environment in close proximity to the transit station ..... 90 5.2 Focus and integrate increased and transit-supportive densities at, and around, transit stations to create a compact built form and a critical mass of activity, while ensuring appropriate transition to the surrounding community 94
6 An attractive public realm.	THEME ONE A STRONG SENSE OF PLACE	6.1 Create an attractive and comfortable public realm with a strong sense of place in order to support a walkable station area and promote the use of transit 100
7 A minimized ecological footprint.	THEME ONE MINIMIZED ECOLOGICAL FOOTPRINT	7.1 Prioritize and implement innovative sustainable energy, water, landscape and waste management practices 110

SUCCESSFUL IMPLEMENTATION

OBJECTIVES	THEMES	GUIDELINES
Flexible planning to accommodate growth and change. 8	THEME ONE DESIGNING WITH CHANGE IN MIND	8.1 Develop detailed phasing strategies connected with infrastructure improvements 118
	THEME TWO A RESPONSIVE PLANNING FRAMEWORK	8.2 Develop performance measures to evaluate and monitor implementation progress connected to the phasing strategy 121
Effective partnerships and incentives for increased public and private investment. 9	THEME ONE ENHANCING DEVELOPMENT POTENTIAL AND ATTRACTING DEVELOPERS	9.1 Encourage development by providing developer incentives such as height and density exchange, flexible zoning and through mechanisms like bonds, debentures, and Tax Increment Financing (TIF) ..... 126 9.2 Plan public investment and infrastructure to create and/or enhance development potential 131
	THEME TWO ESTABLISHING PARTNERSHIPS BETWEEN STAKEHOLDERS	9.3 Engage in joint development and other public-private partnership models to capture the land value uplift from transit infrastructure investments 133
	THEME THREE INCENTIVES FOR DESIGN INNOVATION AND EXCELLENCE	9.4 Establish a development checklist as a tool for new development and retrofits in the mobility hubs ..... 135 9.5 Consider design competitions for public facilities and incorporate design review panels into the municipal development approval process 137

SEAMLESS MOBILITY

SEAMLESS MOBILITY

Seamless integration of modes.

FIG 1.1 Stratford Station in London demonstrates a well laid out, seamless transportation interchange.

Seamless integration of modes at the rapid transit station.

One of the essential functions of mobility hubs will be to foster seamless integration between transit modes, systems, and routes, while accommodating efficient connections to all modes of access to and from the station.

THEME ONE

SEAMLESS TRANSFERS BETWEEN TRANSIT MODES, NETWORKS, AND ROUTES

1.1 Create clear, direct, and short transfers between transit modes and routes, including accessible conventional and specialized transit.

1.2 Coordinate local feeder transit service schedules and routes to provide seamless connectivity between local, regional, and rapid transit services.

THEME TWO

BALANCED ACCESS TO AND FROM TRANSIT STATIONS

1.3 Create safe and direct pedestrian and cycling routes to rapid transit stations from major destinations and regional cycling and pedestrian networks.

1.4 Provide secure and plentiful bicycle parking at station entrances with additional cycling amenities at high volume locations.

1.5 Adopt transit priority measures to ensure the efficient movement of surface transit to and from the station area.

1.6 Provide clearly marked and protected access for pedestrians and cyclists at station areas to minimize conflicts, particularly at passenger pick-up and drop-offs (PPUDO), bus facilities, and parking access points.

1.1 Create clear, direct, and short transfers between transit modes and routes, including accessible conventional and specialized transit.

Approaches

1.1.1 Consider the provision of facilities for specialized transit services to assist in the coordination of inter-regional travel for persons with disabilities. Identify and prioritize major transfer movements by locating services with high transfer volumes and similar trip patterns in close proximity to each other.

- Specialized transit vehicles could be accommodated for off-street transfers at bus loops, while services provided by accessible taxis can be accommodated in designated accessible pick-up and drop-off areas.
- When appropriate, coordinate arrival and departure times for accessible transit services to allow for convenient inter-regional travel.

1.1.2 Where feasible, walking distances should be minimized between the accessible/barrier-free entrance(s), elevators and escalators.

- When there are high levels of alighting passengers, provide drop-off only service areas on platforms to reduce congestion at boarding areas.
- Cross-platform transfers can significantly improve station circulation at locations where many transfers occur.
- Provide appropriately sized and laid out service areas for connecting local feeder services.

Where regional coach services are provided, an off-street terminal is appropriate due to extended layover times and larger vehicle size.

» Where local transit services provide through-service with high frequency, an on-street connection is sufficient and reduces the need for local bus terminal facilities.

» An off-street terminal should only be considered when multiple routes, in excess of what can be accommodated by on-street service bays, serve a transit station or in situations where timed transfers are necessary. Provide central service platforms between feeder services for greatest convenience.

1.1.3 Create "fare-paid" zones within transit stations to minimize delays from fare payment and speed up boarding.

- Where on-street transfers are desired, connect service platforms to fare paid areas of the station through protected transfer ways. Design transfer ways and waiting areas as to avoid the obstruction of sidewalks and pathways.
- Outside of fare paid areas, provide off-vehicle accessible fare vending machines to allow customers to purchase fares before boarding transit vehicles.

1.1.4 In multi-level stations, provide ample points of vertical circulation, including escalators and elevators, between transit services and to station entrances. To ensure accessible vertical circulation is always available, plan for redundancy by including ramps whenever possible.

Benefits

- Minimized time penalties caused by transfers
- Reduced walking distance when transferring.
- Easy and clear navigation between modes and routes.
- Helps to minimize station footprint.
- Efficient transit service with improved boarding and alighting times.
- Reduced congestion in station and station areas.

Applicability

All Mobility Hubs
Primary Zone of Influence

Tools & Resources

Origin-Destination Surveys
To determine major transfer flows at transit stations

Transportation Demand Forecasting/Modeling

Station Pedestrian Simulations

Station and Route Ridership Counts

AODA Built Environment Standard

1.1.5 When long corridors (over 5 minute walk) are required to facilitate transfers, maintain a high quality customer experience by providing weather protection, visual interest and moving walkways.

- Accessible real-time service information at corridor entrances allows customers to pace their walk according to when their next service is arriving.
- Locate retail uses along corridors with high passenger volumes. Retail areas should not, however, conflict with pedestrian movement or obscure wayfinding features.
- Use public art, lighting, and landscaping to improve the visual environment.
- To reduce capital costs, a single moving walkway can be implemented for peak direction travel only. To ensure the safety of users who have low vision or who are blind, whenever implemented, moving walkways should provide an audible cue to indicate that the user is approaching the end of the walkway. Reversible moving walkways should also adhere to a strict schedule to allow users to predict walkway direction.

FIG 1.2 Transfer corridor of Tokyo Metro Fukutoshin Line, Shibuya Station.

1.1.6 Locate clearly marked taxi and passenger pick-up areas within direct sight and at close proximity to station entrances.

- Provide clear directional signage within stations and at station entrances, directing customers to passenger pick-up areas.
- Provide signage at vehicular station access points to direct taxis and vehicles to appropriate queue areas to reduce congestion in station areas.
- Ensure queue areas provide adequate capacity to prevent taxis and vehicles from blocking roadways and pedestrian paths.
- Where space is limited near station entrances, locate a satellite "cell-phone lot" in the station vicinity to reduce congestion at passenger pick up facilities. Provide pay phones with free short-duration calls to coordinate taxi or passenger pick-up at pick up areas.

FIG 1.3 Transfers should minimize walking distance and vertical separations – this light rail stop in Croydon, UK provides direct access to on-street bus stop.

FIG 1.4 The centralized connecting service platform at St. Clair West subway station provides a seamless connection.

FIG 1.5 Well lit corridors with moving walkways, real time information, & visual interest.

FIG 1.6 This cross platform interchange at Stratford Station in London, UK provides the most efficient movement between two routes with heavy transfer movements.

FIG 1.7 At Gare l'Ouest in Brussels, buses and light-rail share a common platform, eliminating need for separated service areas.

FIG 1.8 Clearly defining station areas for various modes improves the legibility and navigability when transferring between routes and modes. Milwaukee, Wisconsin.

FIG 1.9 Rapid transit, feeder bus, and taxi areas at Hastings Station are all accessible from a central pedestrian plaza.

1.2 Coordinate local feeder transit service schedules and routes to improve connectivity between local, regional, and rapid transit services. 1.5 4.2

Approaches

1.2.1 Operate local feeder transit services during rapid transit operating hours.

- First and last feeder buses should be coordinated with first and last rapid transit service times.
- During periods of low ridership, consider demand responsive transit service such as dial-a-bus or shared-ride taxi programs. u5

1.2.2 Clearly indicate routes that serve rapid transit stations on destination signage, such as prefixing route numbers or placing a logo on destination signs to show that it serves a rapid transit station.

1.2.3 Where connecting services are infrequent, schedule timing points and layovers at rapid transit stations, so that trip times are timed with train arrivals and departures.

- Coordinate communication systems and standard operating procedures between transit agencies to inform early or late departures and arrivals of connecting services.
- Provide off-street terminals to facilitate transfers where on-street layovers to create a timed transfer are not possible.

1.2.4 Investigate opportunities for dedicated local feeder services to rapid transit stations.

- Develop partnerships with nearby destinations, such as shopping malls and office parks, to fund or operate feeder services. u6
- Create premium fare express shuttle services from nearby communities during peak periods.
- Promote carpooling in areas where there is insufficient local transit service. u5 t1

1.2.5 Where fares are not integrated, provide reduced local transit fares when transferring from regional or rapid transit to encourage the use of feeder transit services.

- Consider implementing free-fare zones that allow customers to board local transit buses for free within mobility hubs to encourage feeder transit use.

Benefits

- Reduced waiting times for connecting services.
- Encourages ridership on feeder transit services.
- Reduced demand for commuter parking.

Applicability

All Mobility Hubs

- Where local feeder transit or rapid transit services are infrequent.
- Most important in primary zone of influence at transit stations.
- Service coordination may also be necessary at key locations in secondary and tertiary zones.

FIG 1.10 Buses serving GO Stations in Oakville are indicated by the GO Transit logo in destination signage.

Legend

Especially Relevant Urban Typologies

- u1 CENTRAL TORONTO
- u2 URBAN TRANSIT NODES
- u3 EMERGING GROWTH CENTRES
- u4 HISTORIC SUBURBAN TOWN CENTRES
- u5 SUBURBAN TRANSIT NODES
- u6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- t1 ENTRY
- t2 TRANSFER
- t3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

1.3 Create safe and direct pedestrian and cycling routes to rapid transit stations from major destinations and regional cycling and pedestrian networks. 1.6 2.3 2.4 2.5 6.1

Approaches

1.3.1 Review and evaluate existing pedestrian, cycling and accessible connections between adjacent communities to transit stations to determine needs for improved connections. Internal transit station design should also accommodate bicycles.

- Identify missing connections and inadequate pedestrian/cycling environments (lighting, paving, street furniture, safety).
- Identify existing high-quality accessible pedestrian and cycling paths or highly-used routes.

1.3.2 Develop direct routes from regional and municipal cycling and walking facilities to transit stations.

- Where possible, locate routes along main access roadways to encourage pedestrian activity along station area streets and integrate pedestrian/cycling into the right-of-way.
- Extend municipal and regional multi-use trails, walkways and cycling facilities into station areas where possible.
- Where municipal or regional walking/cycling facilities do not exist, target development of routes and connections within walking distance of transit stations.
- Design routes along desired lines to minimize walking and cycling distance.

1.3.3 Ensure pedestrian and cycling facilities are designed to a high standard of safety, security, and comfort for all users, including persons with disabilities and persons using mobility devices. 2.2 2.5

Benefits

- Increased pedestrian and cycling access to rapid transit stations.
- Coordinated network of walking and cycling paths between mobility hubs and surrounding communities.
- Reduced walking and cycling distance to transit stations.
- A high quality pedestrian realm that supports street level activity and uses.

Applicability

All Mobility Hubs

- Pedestrian routes should be especially well connected within the primary and secondary zones.
- Cycling routes should reflect cycling commuter patterns which can extend well beyond the tertiary zone.
- Ensure high-quality connections to major destinations in all mobility hub zones, including the tertiary zone and beyond.

FIG 1.11 Not desired. Crossings that do not follow pedestrian desire lines, creating potential for forced unsafe crossings.

FIG 1.12 Walkways to transit stations should be weather protected and free of conflicts with vehicular traffic.

Legend

Especially Relevant Urban Typologies

- 01 CENTRAL TORONTO
- 02 URBAN TRANSIT NODES
- 03 EMERGING GROWTH CENTRES
- 04 HISTORIC SUBURBAN TOWN CENTRES
- 05 SUBURBAN TRANSIT NODES
- 06 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

1.4 Provide secure and plentiful bicycle parking at station entrances with additional cycling amenities at high volume locations. 2.1 2.2 2.5 3.3

Approaches

1.4.1 Provide visible and weather protected bicycle parking.

- Minimum provision of bicycle parking should consist of post and rings or stationary bike racks with overhead weather protection.

1.4.2 Bicycle parking should be in well-lit and visible areas to increase security.

- Locate bicycle parking near station entrances, areas with high pedestrian/cycling traffic, and in locations within public view.
- Video surveillance can provide added security.

1.4.3 Ensure bicycle parking does not conflict with vehicular traffic or pedestrians.

- Provide adequate space between bicycle parking spaces and pedestrian corridors and roadways.
- Orient bicycle parking facilities to allow bicycles to park without impeding pedestrian or traffic flow.
- Designate space within a short walking distance of station entrances for bicycle parking connected to main pedestrian corridors.

1.4.4 Where high volumes of bicycle access to the transit station exist or are expected, provide enhanced bicycle parking and amenities.

- Forecast bicycle parking needs according to planned transit services and cycling facilities around the mobility hub.
- Where long-term bike storage is needed, provide access to bike lockers or storage facilities that offer a greater level of security.
- Regularly monitor bicycle parking usage to ensure adequate bike parking.
- Staffed bike stations can provide a large amount of secure bike parking with amenities such as lockers and change rooms and services such as pro shops and bike repairs.

1.4.5 Ensure secure bicycle parking designs.

- Bicycle racks should allow both the front wheel and frame to be secured with a standard sized U-Lock.
- Bicycle parking should be secured to the ground or to a building.

Benefits

- Encourage cycling access to transit stations.

FIG 1.13 Bicycle parking shelters at GO Stations are a positive first step in accommodating bicycles at transit stations.

FIG 1.14 Bike Stations provide an enhanced level of amenity at transit stations with high volumes of cycling access with staffed, secure bike storage.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

1.5 Adopt transit priority measures to ensure the efficient movement of surface transit to and from the station area. 2.3 4.2

Approaches

1.5.1 Develop a transit priority program within mobility hub master plans, outlining locations for physical and/or signal priority.

1.5.2 Require developments with significant traffic impacts to contribute funds to transit agencies for transit priority improvements through Section 37 of the Planning Act arrangements.

1.5.3 Install transit priority signals along main transit corridors that extend green times or reduce red times at intersections where transit is often delayed by vehicular congestion.

1.5.4 Construct queue jump lanes with signal priority at major intersections with major congestion and at station access points to speed up access into and out of stations.

1.5.5 Provide dedicated transit lanes when warranted by passenger volumes or traffic conditions.

- Provide dedicated access points into transit terminals and stations to avoid conflicts and delays caused by other vehicular traffic.
- If transit lanes are not physically separated, consistently or during certain hours of the day, ensure an adequate enforcement plan is in place.
- Consider using permanent dedicated transit rights-of-way along major transit corridors to encourage intensification.

1.5.6 When developing new road right-of-ways, reserve space for future dedicated transit lanes along identified corridors within road right-of-way or through easements on fronting properties.

- Negotiate property easements as development applications are submitted.
- Identify future transit property needs and acquire as properties enter market.

FIG 1.15 The landscaped median in CityPlace in Downtown Toronto is reserved for future use as a dedicated transit right-of-way, eliminating potential future conflicts of reducing vehicular lanes.

FIG 1.16 Providing transit queue jump lanes at congested intersections helps to improve travel times and reliability for feeder transit services.

Benefits

- Improved transit travel times into rapid transit stations as transit is protected from congestion.
- Creates a larger zone of influence for rapid transit stations by increasing the catchment area for the transit station which may encourage development along main transit corridors.

Applicability

All Mobility Hubs

- Transit priority measures are typically used to improve access/egress to/from stations for transit vehicles.
- Transit priority may be justified beyond the station area, including the secondary and tertiary area and beyond, along busy transit corridors.

Tools & Resources

- Traffic Simulations
  - » Identify areas of congestion and delay for transit services.
- City of Ottawa Transit Priority Program: Putting Buses First
- Ontario Transit Supportive Land Use Guidelines – Section 4.4 Transit Priority Measures

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

1.6 Provide clearly marked and protected access for pedestrians and cyclists at station areas to minimize conflicts, particularly at passenger pick-up and drop-offs (PPUDO), bus facilities, and parking access points.

Approaches

1.6.1 Wherever possible, provide dedicated access to PPUDO and taxi areas to avoid conflict with park and ride and feeder transit.

1.6.2 PPUDO and taxi areas should provide one-way traffic flow with opportunity for recirculation to reduce vehicular conflicts and maximize efficiency of traffic flow.

1.6.3 Locate PPUDO and taxi areas adjacent to station entrances to minimize walking distances.

1.6.4 Separate queueing areas with pedestrian islands, connected by clearly marked crosswalks and walkways.

- Ensure that islands are designed to be safe for all users and have accessible features such as raised truncated domes.

1.6.5 Ensure PPUDO and taxi areas are clearly marked with enforced limits for waiting times to prevent congestion.

- Provide a satellite queueing area ('cell phone lot') in close proximity to reduce queueing times.

Benefits

- Improved safety for passengers accessing stations by drop-off or taxi.
- Improved layout of queueing areas to reduce congestion.
- Reduced conflicts between vehicles, pedestrians and cyclists.

Applicability

Transit stations with significant passenger pick-up and drop-off activity that requires queueing space.

FIG 1.17 This taxi rank at St. Pancras Station is located adjacent to station entrance and free of other vehicular traffic.

SEAMLESS MOBILITY

Seamless integration of modes.

1

FIG 2.1 Broadway in New York City has been transformed into a shared space roadway, offering balanced space between motorists, cyclists, and pedestrians while creating new public spaces.

Safe and efficient movement of people with high levels of pedestrian priority.

Planning, design and implementation of mobility hubs will build upon the traveller transportation hierarchy, identified in The Big Move (policy 5.11), to promote a shift in mobility behaviour and support a balanced transportation system.

THEME ONE

CLEAR MODE SHARE AND TRANSPORTATION PERFORMANCE TARGETS

2.1 Define mode share targets and other transportation performance measures to inform the development of land use and transportation planning and policy in mobility hubs.

2.2 Develop Transportation Demand Management (TDM) plans for mobility hubs and integrate development-specific travel plans into the planning approvals process.

THEME TWO

COMPLETE AND SAFE STREETS

2.3 Build or retrofit a network of complete streets to create a balance between the movement of pedestrians, cyclists, transit, and vehicles. Adopt road design standards that ensure safe movement of all road users.

2.4 Provide an attractive pedestrian environment with a high level of priority, safety and amenities.

2.5 Create cycling-supportive streets and communities.

2.6 Adopt goods movement strategies within mobility hubs that support complete streets, while ensuring the efficient delivery of goods and services.

2.1 Define mode share targets and other transportation performance measures to inform the development of land use and transportation planning and policy in mobility hubs. B.2

Approaches

2.1.1 Develop transportation performance measures and mode share targets based on existing and future land use and transportation network contexts.

- **Assess existing travel patterns and behaviour** using tools such as travel demand models, travel and transit ridership surveys, and cordon counts.
- **Define phased and ultimate transit and transportation networks:** establish when transit and mobility infrastructure will be implemented to define phasing of targets and development.
- **Establish targets and performance measures based on network assessment and phasing.**

2.1.2 Include a range of transportation performance targets, such as:

- **Mode share targets:** This is the most common target set within transportation plans and involves percentage targets for walking, cycling and transit.
  - » In areas where transit networks are not fully established or where there is limited walking or cycling potential, a generalized non-auto mode share target is appropriate.
  - » Targets for specific modes are ideal in areas where there is potential for significant mode share increase, for example, walking or cycling in an urbanized area.
  - » Include station access mode targets that reflect the high level of pedestrian activity and cycling expected at mobility hub transit stations.
- **Trips per Capita:** Similar to percentage targets, but based upon absolute values in relation to population and employment to reflect magnitude of travel choices. Useful in areas of larger population and employment and to assist in comparison with peer groups.
- **Vehicle Kilometres Traveled/Trip lengths:** Absolute values of distance traveled by vehicles and by trip in an area can provide an indicator of how distant and how frequent travel is required. Applicable to mobility hubs with separated single uses, where most trips require longer travel distances, but can be reduced through transition to mixed-use, transit-focused communities.
- **Auto occupancy:** Based upon the number of passengers per vehicle, applicable to areas with a high proportion of single-occupant vehicles and with a high potential for carpooling or rideshare.
- **Transit service levels:** Can include number of service hours in a given area, proximity of population, and employment within a specified distance of public transit. Applicable when transit networks are not fully developed and where rapid transit is not yet implemented.

Benefits

- Development of targets on which land use and transportation policy will be developed.
- Clear and realistic benchmarks to trigger phasing of transportation and land use policies.
- Improved coordination between land use and transportation infrastructure.

Applicability

The development of mode share targets should be undertaken in the planning of all mobility hubs. These targets should be sensitive to the existing and planned urban and transportation context, such as the following scenarios:

- Where there is currently no rapid transit.
- Where rapid transit currently exists with:
  - » Mature, stable neighbourhoods targeted for moderate intensification; or
  - » Areas of significant redevelopment or intensification.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

2.1.3 Base transportation targets directly on goals and objectives.

- Tie transportation targets with mobility hub goals and objectives, for example, non-auto mode share targets should be linked with improved transit, walking and cycling objectives.
- Targets should also be informed by objectives within these mobility hub guidelines, regional and municipal official plans and transportation plans, provincial planning and transportation policy statements, The Big Move, and other documents produced by the MTO.

THE BIG MOVE

Refer to Backgrounder: **Modelling Methodology and Results** for guidance on projected transportation performance measures resulting from the implementation of the regional rapid transit network in **The Big Move.**

Case Study

TYING TRANSPORTATION TARGETS TO CITY VISION, OBJECTIVES AND POLICIES

CITY OF HAMILTON TRANSPORTATION MASTER PLAN

- Short and long term modal split targets were developed for Hamilton's Transportation Master Plan (2006) based upon the City's goals, objectives, and policies, past trends, and land use and demographic factors.
- Targets set based upon land use and transportation vision in Hamilton's Vision 2020 Plan and the Growth Related Integrated Development (GRID) Strategy.
- Two additional measures, the reduction of vehicle kilometres travelled and annual transit rides per capita, were identified that support the identified mode share targets.

FIG 2.2 Hamilton's transportation targets were developed to support existing City initiatives, such as B-Line Bus Rapid Transit.

Transportation Network Targets for City of Hamilton

	Daily Vehicle Travel (km)	Single-occupant Vehicles	Transit Mode Share	Walking/ Cycling Mode Share	Annual Transit Rides per Capita
SHORT TERM	4.3M	58%	9%	10%	60
LONG TERM	3.8M	52%	12%	15%	80-100

These transportation targets identified for the City of Hamilton reflect the desire to reduce vehicular travel, while shifting travel demand to transit and walking/cycling. They provide guidance on the priority of future policy and investment, such as increasing transit ridership, improving the pedestrian and cycling environment, and encouraging transportation demand management programs to increase auto occupancy while reducing overall vehicular trips. The targets reflect Hamilton's land use vision of developing pedestrian friendly nodes connected to corridors of rapid transit.

2.1.4 Clearly establish how and when targets will be achieved.

- Identify market segments, such as trips to, from, and within mobility hub areas on which to establish targets, with associated policies.
  - For example, in suburban areas adjacent to commuter rail, transit mode share that originate in the area may be high, but not for trips into the area. Target can focus on increasing transit mode share into the area through improved feeder transit services. 45
- Avoid setting targets over long timelines and instead aim for measured and incremental changes over intermediate stages.
- Coordinate intermediate stages for transportation targets with time horizons for The Big Move including:
  - Big 5 Projects;
  - 15-year Regional Transportation Plan network; and
  - 25-year Regional Transportation Plan network.
- Where timing of implementation of specific rapid transit projects is known, use the operational date of these projects as staging horizons.
- Integrate mode share and transportation performance targets into phasing plans of major developments and consider approval of subsequent phases based on the achievement of targets.
- Include targets based on magnitude (such as length or area coverage) of infrastructure improvements, such as:
  - The development of a specified length of new cycling routes: *"15 kilometres of new bicycle lanes"*;
  - Proportion of population within a certain walking distance of a transit route: *"95% of residents and jobs within a five minute walk of frequent transit service"*; or
  - A percentage of streets with sidewalks: *"100% of residential streets retrofitted with sidewalks on both sides of street"*.

2.1.5 Identify how targets will be measured and tracked.

- Can be done by monitoring transit ridership, conducting regular travel demand surveys, and producing regular reports documenting the performance of mode share initiatives.
- Can also evaluate outcomes from Transportation Demand Management programs and other initiatives.

Case Study

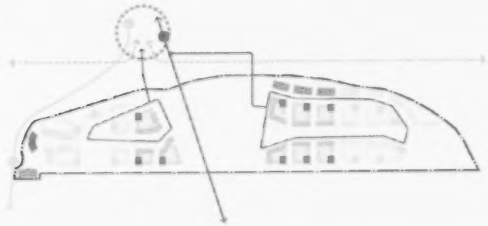
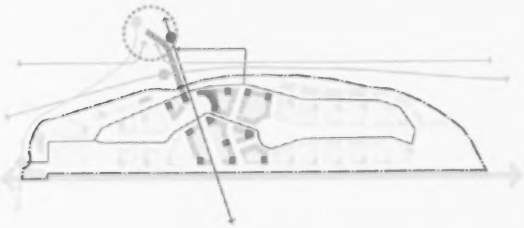
TRANSPORTATION TARGETS BASED ON DEVELOPMENT PHASING
LANGSTAFF GATEWAY, MARKHAM

Langstaff Gateway is a major proposed redevelopment of a low-density industrial area in York Region and will eventually be home to over 20,000 residents and jobs in a medium- to high-density, compact development. It will be served by a number of rapid transit lines, including the Yonge Subway Extension, the Richmond Hill Express Rail line, Viva rapid transit, and the 407 Transitway. With the high levels of anticipated transit service to be phased in, the mode share targets developed for Langstaff Gateway are directly linked to performance measures and the implementation of transit infrastructure. In each of the three phases of the project, benchmarks have been developed that must be met by development before proceeding to latter phases.

FIG 2.3: Density proposed around Langstaff Subway Station.

Development of Phasing and Mode Share Targets

- Use transportation planning models such as EMME/2 or TransCad, which estimates modal shares based on available travel options and costs, taking into account travel patterns.
- A "back-casting" approach which takes into account road capacity and the modal shares that are required to keep auto volumes at levels that can be accommodated.

DEVELOPMENT PHASING AND TRANSPORT INFRASTRUCTURE	TRANSPORTATION NETWORK COMPONENTS	NON-AUTO MODE SPLIT TARGET
1	• Existing transit network -Bus Rapid Transit -Rush-hour Commuter Rail	35%
2 	• Internal transit shuttle to Richmond Hill Centre • Bikeshare & Car Share • Yonge Subway Extension • All-day, two-way Regional Rail	50%
3 	• Internal transit shuttle to Richmond Hill Centre and subway • Continuous east-west bike network • Viva Highway 7 Rapidway • Highway 407 Transitway • Express Rail • Mobility Hub pedestrian concourse	65%

2.2 Develop transportation demand management (TDM) plans for mobility hubs and integrate development-specific travel plans into the planning approvals process.

Approaches

2.2.1 Develop a TDM plan as part of mobility hub planning.

- Travel plans are long-term strategies aimed to attain sustainable transportation objectives. They should be developed in conjunction with the setting of mode share and other transportation performance targets in Guideline 2.1. 2.1
- Set out the overall transportation goals and objectives in mobility hub areas that aim to minimize single-occupancy vehicle use and encourage travel by foot, bicycle, transit and carpooling.
- Integrate existing TDM strategies into travel plans.
- Area-wide travel plans will inform the creation of development-specific travel plans. 2.2.2
- Develop land use and development intensity thresholds for requiring a development-specific travel plan.

2.2.2 Integrate development-specific travel plans into the planning approval process for developments within mobility hubs.

- Require the completion of a development-specific travel plan for new developments of a minimum size and use within mobility hub areas.
- Travel plans should include site design measures that promote sustainable mode choices and proposed programs and initiatives to encourage walking, cycling, transit use and carpooling.
- Funding for physical improvements identified in travel plans can be secured through existing capital programs or through negotiations in conjunction with Section 37 of the Planning Act, development charges and levies.

Benefits

- Supports existing Transportation Demand Management programs.
- Ensures that new developments are consistent with transportation objectives within mobility hubs.
- Encourages alternative modes, such as walking, cycling, transit, and carpooling.

Applicability

All Mobility Hubs

Tools & Resources

- UK Department for Transport: Travel Plans
- Good Practice Guidelines
- Manchester, UK Travel Plan Checklist

Legend

Especially Relevant Urban Typologies

- 01 CENTRAL TORONTO
- 02 URBAN TRANSIT NODES
- 03 EMERGING GROWTH CENTRES
- 04 HISTORIC SUBURBAN TOWN CENTRES
- 05 SUBURBAN TRANSIT NODES
- 06 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

Case Study

FIG 2.4 Smart Commute & Smart Commute Mississauga online commuting tools.

TRANSPORTATION MANAGEMENT THROUGH EMPLOYEE CARPOOL PROGRAMS

MISSISSAUGA, ONTARIO

The 2008 Metrolinx Commuter Attitudes Survey indicates that almost 70% of employees in the GTHA feel that their commute experience affects their job satisfaction. In addition, lone drivers indicate that they feel no improvement in their commuting satisfaction over the past few years.

According to the 2008 Smart Commute Commuter Attitudes Survey, employee carpool programs can have significant impacts on daily travel habits and employee job satisfaction. In the GTHA, one of the most effective carpool programs has been implemented by Hatch Ltd., a Mississauga-based engineering consulting firm which launched its carpool program in 2007 due to a severe parking shortage. Hatch's achievement demonstrates that TDM programs are an easy to implement, cost-effective and environmentally friendly approach to reducing congestion in the GTHA.

Establishing the Program:
Hatch collaborated with Smart Commute Mississauga, a local Transportation Management Association. An initial survey indicated notable interest for carpooling within the company. In order to determine employee commuting patterns, Hatch took advantage of the 'Carpool Zone', an online system to help employees find carpool matches.

With the assistance of Smart Commute Mississauga, the company also:

- Maintains an Emergency Ride Home Program which provides up to $50 towards the cost of a taxi for an employee who experiences an unplanned emergency or overtime
- Manages an incentive program that provides a nominal cash incentive to drivers for every passenger they bring to work each day
- Provides carpoolers with reserved parking spots near the front entrance of the building
- Organizes different events and promotions to encourage and reward carpoolers

Results:

- 20 less parking spots needed
- No new parking facility needed
- 1.5 million km less in commuter traveling
- 400,000 kg less greenhouse gas emissions
- Savings of over $780,000 in fuel and maintenance costs for employees
- Reduced commute times through the use of High Occupancy Vehicle (HOV) lanes

Case Study

FIG 2.5 Walking School Bus, Green Communities

TRAVEL PLANNING PRACTICES
ONTARIO

Travel Planning can be applied when developing TDM measures for the mobility hub context. School Travel Planning (STP) is an example of a practice used to encourage sustainable travel to and from schools, and can provide important travel planning lessons.

Stepping it Up

"Stepping it Up", a program lead by Metrolinx, focuses on travel plans for elementary schools throughout the region. The program is based on a scheme originally developed by Green Communities Canada. The process involves a comprehensive investigation of school travel conditions, taking into account the existing travel-related built environment, perceptions, policies, and programs.

The program relies on the following data collection methods:

- Baseline surveys (involving students, parents and staff)
- Traffic counts (conducted by municipal staff and volunteers)
- Walkabout assessments completed at the start of each school year (conducted by a diverse group of school and community members, along with transportation specialists)

The data is fed into the 'School Travel Plan', which recommends tailored school travel activities, programs, amenities and infrastructure improvements. Implementation and careful monitoring of travel plans can increase rates of active transportation, compared to baseline measurements. STP methods and processes, such as walkabout assessments for example, can be tailored and applied on a larger scale over the longer term to be suitable for the mobility hub context.

Case Study

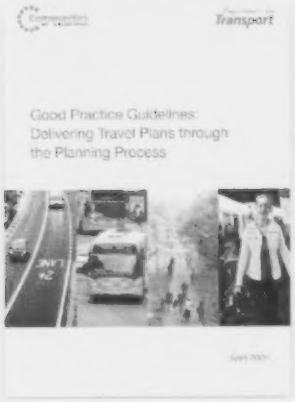


FIG 2.6 Department for Transport, UK (2009). Good Practice Guidelines: Delivering Travel Plans through the Planning Process.

TDM PLANS
UNITED KINGDOM

TDM plans (also known as travel plans in the United Kingdom) are a key part of the planning process in the United Kingdom as a required component for planning consent or development approval. Typical plans in new developments would include TDM measures to encourage sustainable mode choices and contributions to improve walking, cycling, and transit networks through Section 106 Agreements (similar to Ontario's Planning Act, Section 37). In London, Transport for London requires full travel plans as part of most new developments over a certain size and of particular uses. In addition, for developments that do not reach the threshold, a Travel Plan Statement will be required.

Elements of a Successful Travel Plan

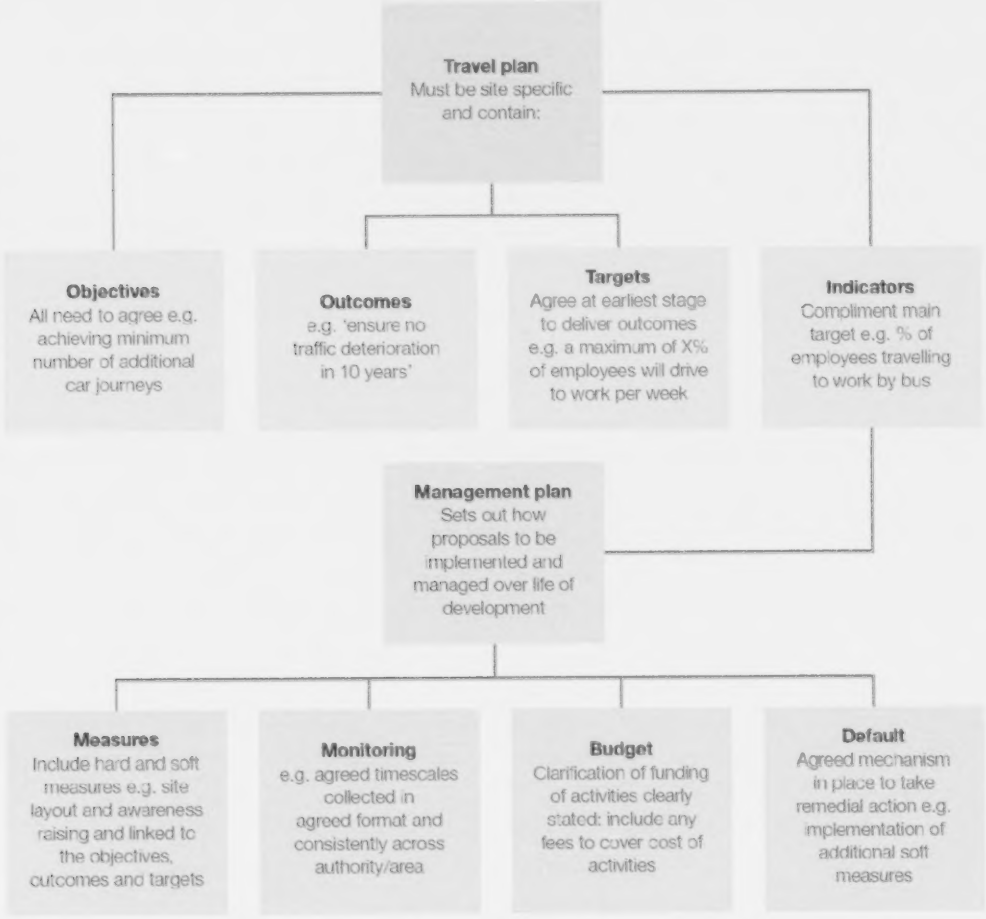

Travel plan
Must be site specific and contain:
Objectives
All need to agree e.g. achieving minimum number of additional car journeys
Outcomes
e.g. 'ensure no traffic deterioration in 10 years'
Targets
Agree at earliest stage to deliver outcomes e.g. a maximum of X% of employees will drive to work per week
Indicators
Compliment main target e.g. % of employees travelling to work by bus
Management plan
Sets out how proposals to be implemented and managed over life of development
Measures
Include hard and soft measures e.g. site layout and awareness raising and linked to the objectives, outcomes and targets
Monitoring
e.g. agreed timescales collected in agreed format and consistently across authority/area
Budget
Clarification of funding of activities clearly stated: include any fees to cover cost of activities
Default
Agreed mechanism in place to take remedial action e.g. implementation of additional soft measures

FIG 2.7 Source: Good Practice Guidelines: Delivering Travel Plans through the Planning Process, UK Department for Transport.

2.3 Build or retrofit a network of complete streets to create a balance between the movement of pedestrians, cyclists, transit, and vehicles. Adopt road design standards that ensure safe movement of all road users. 1.3 2.1 2.5 2.6 6.1

Approaches

2.3.1 Create a network of complete streets which are designed to accommodate the most people, rather than vehicles.

- Identify and evaluate allocation of road space by 'person-carrying' capacity instead of 'vehicle-carrying' capacity to create complete streets.
- Ensure all road users are accommodated on major corridors in mobility hub areas. Where possible, provide segregation and protection for bicycles, pedestrians, and transit.

2.3.2 Retrofit existing roadways to improve the accommodation of pedestrians, transit, and cycling.

- Develop phased plans and trial projects for retrofit of existing roadways.
- Reversible lanes or lane-control can be used to adapt to peak traffic volumes and free road space for widened sidewalks or improved bicycle facilities.
- Road diets are an approach to improve road operations, particularly along corridors of inconsistent configuration to reduce bottlenecks.
- With road projects, identify opportunities for improved public space, such as pedestrian plazas, streetscaping improvements, and other pedestrian amenities.

Benefits

- Improves efficiency of road space by moving more people in same space.
- Encourages use of alternative modes of mobility, including transit, walking and cycling.
- Improves street safety for all road users.
- Reduces travel speeds to create a more human-scaled, pedestrian-oriented street.

Applicability

- Complete streets should be implemented throughout the mobility hub, in the primary, secondary and tertiary zones.
- Complete streets approaches should also be considered, when appropriate, along major transit corridors beyond the mobility hub zones.

FIG 2.8 A 'Complete' Street in Hamburg, NY, with space for pedestrians, vehicles, bikes, and on-street parking.

FIG 2.9 Right turn channel removed and converted into public plaza at Parliament and Adelaide Streets in Downtown Toronto.

FIG 2.10 Allerton Avenue in New York City added a median turn lane, bike lanes, and wide parking lanes.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

2.3.3 Adopt pedestrian-friendly vehicular geometry/design standards.

- **Lane widths:** narrower lanes encourage slower travel by vehicles.
- **Turning radii:** tightening turning radii require vehicles to slow down while making turns. Avoid use of channelized right-turn lanes.
- **Curb extensions:** commonly used traffic calming measure at intersections to reduce travel speed.

2.3.4 Improve pedestrian safety when crossing at intersections and mid-block. Some approaches include:

- **Refuge islands:** provides safety for pedestrians across wide streets.
- **Clear crossings:** consistent and visible crosswalk markings.
- **Shorter crossing lengths:** tighter turning radii and/or curb extensions reduce the distance pedestrians are in roadway.
- **Midblock crossings:** reduce walking distance, safety can be reinforced with forced 'z' crossings, raised crossings to increase visibility, signal protection. Ensure raised crossings are safe for persons with vision impairments by providing attention indicators, such as raised truncated domes, to signal the transition between the sidewalk and the road.
- **Scramble crossings:** provides a pedestrian-only phase that allows pedestrians to cross in any direction, applicable at busy intersections.

2.3.5 Provide priority measures and segregation for cyclists.

- **Sharrows:** where road width cannot accommodate bike lanes, sharrows should be used in wide curb lanes to remind drivers to share the road.
- **Bike lanes:** should be direct, connect destinations, and be properly marked and signed with adequate enforcement.
- **Segregation:** should be considered in high-volume bicycle corridors, and where road space allows.
- **Bike boxes:** Provide cyclist priority and safety at major intersections, and at intersections with key cycling facilities.
- **Detectors, push buttons for signals:** Retrofit and mark detection loops to allow cyclists to trigger signals at demand-actuated intersections, or provide push buttons accessible from curb.

FIG 2.11 Curb extension to reduce vehicle speed at midblock crossing.

FIG 2.12 Midblock crossing with forced 'z' crossing and refuge island.

FIG 2.13 'Scramble' phases provide a high level of pedestrian priority.

2.3.6 Develop an interconnected streets and blocks system.

- Increase the intersection density per sq. unit within the Hub. Intersection density is the number of intersections in an area. It corresponds closely to block size – the greater the intersection density, the smaller the blocks. Small blocks make a neighbourhood walkable.
- Streets should connect to more than one street. Dead-ends and cul-de-sacs are strongly discouraged.
- Integrate new streets into the existing surrounding block pattern.
- Street grid patterns should have a clear hierarchy of streets to accommodate a wide range of traffic patterns, including pedestrian, cycling and vehicular.
- Street layout within the mobility hub should be oriented towards the transit station.
- Where possible, street and building configuration should be designed to create vistas or to terminate views with a landmark feature, building or public space.
- Where possible, street and building configuration should be designed to feature the rapid transit station as a prominent community feature.

FIG 2.14 Sharrows serve as a reminder to drivers to share the road with cyclists.

FIG 2.15 Clearly marked bike lanes on No. 3 Road, Richmond, BC.

FIG 2.16 Segregated bike lane with bus stop treatment in Montreal, QC.

Case Study

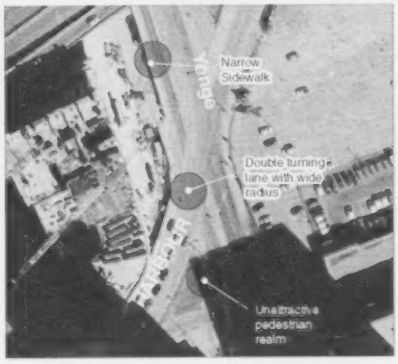
CREATING PEDESTRIAN PROMENADES THROUGH INTERSECTION AND STREETSCAPE ENHANCEMENTS TORONTO WATERFRONT, ON

- Development of Pedestrian Promenade Plans in corridors connecting downtown Toronto to the waterfront to improve pedestrian environment, safety, and aesthetics.
- Plans identify existing conditions, pedestrian amenities, and past and future initiatives.
- Design objectives and recommended plans were developed as well as implementation strategies.
- Streetscape improvements are mainly funded by contributions from abutting developments, Community Improvement Plan budgets and intersection improvements from the City's capital budget.

FIG 2.17 Yonge Street Promenade.

YONGE & HARBOUR/ LAKESHORE IMPROVEMENTS

- Promenade Plan identified safety issues with heavy turning movements and aesthetic issues with narrow sidewalks and inadequate streetscaping.
- Plan included reduction to a single left-turn lane, wider sidewalks with improved streetscaping, and the introduction of bike lanes on Yonge Street.



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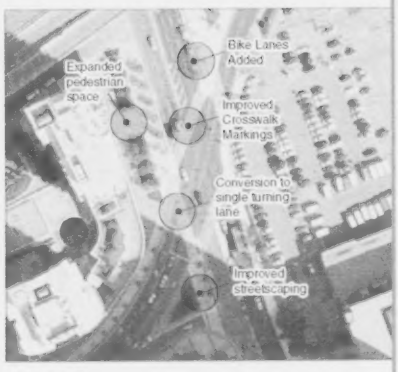

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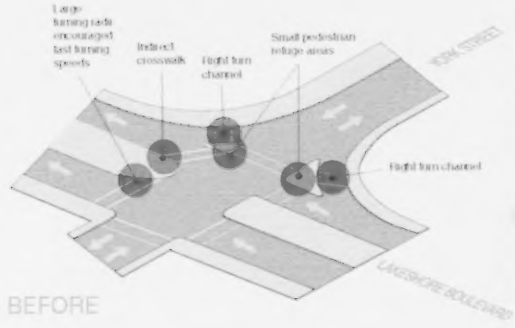

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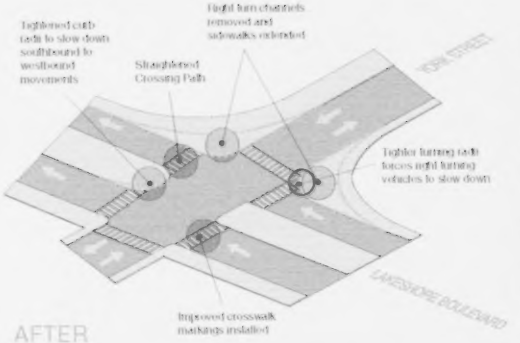

Tightened curb radii to slow down southbound to westbound movements
Right turn channels removed and sidewalks extended
Straightened Crossing Paths
YORK STREET
Tighter turning radii forces right turning vehicles to slow down
LAKESHORE BOULEVARD
Improved crosswalk markings installed

AFTER

YORK & LAKESHORE IMPROVEMENTS

- Multiple conflicts identified at intersection, including inadequately sized refuge islands, right-turn channels, and indirect and poorly marked crosswalks.
- Improvements removed right-turn channels and extension of curbs, which allowed for straightening of crosswalks, reduced crossing distances, and slower turn speeds.

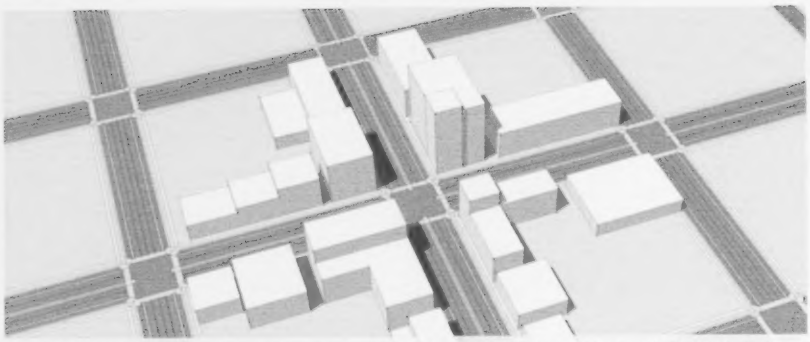


FIG 2.18 An interconnected network composed of short, regular blocks provides multiple travel choices and creates high-profile 'corners' for retail visibility or signature architecture.

FIG 2.19 Good: Lanes, No Median, Bike Lanes Sidewalks.

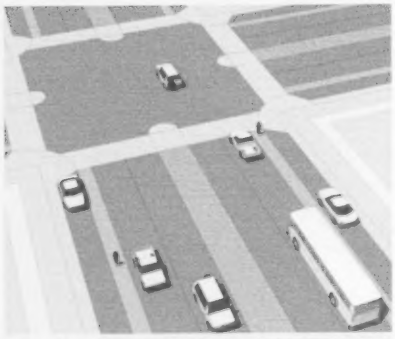


FIG 2.20 Best: Lanes, Bike lanes, Median, Sidewalks.

2.4 Provide an attractive pedestrian environment with a high level of priority, safety, and amenities. 1.3 2.3 6.1

Approaches

2.4.1 Identify pedestrian priority routes in mobility hubs linking transit stations with nearby destinations and local/regional pedestrian networks.

- Routes should provide direct connections to station entrances.
- Conduct walkability studies along priority corridors to identify barriers to station access and adequacy of pedestrian amenities, including the provision of safe and accessible routes for persons using mobility devices.
- Priority corridors should also be identified between main destinations in mobility hub areas.

2.4.2 Address barriers to pedestrian and cycling access at transit stations.

- Develop strategies to address barriers identified in pedestrian priority routes and transit station access.
- Take advantage of existing connections across barriers provided by transit stations, such as station corridors under tracks at rail stations.
- Ensure directional signage is provided where barriers exist to guide pedestrians and cyclists to destinations.
- Work with municipal and provincial agencies, such as the MTO, to facilitate the removal of pedestrian barriers with highway, rail, and road improvement projects.

2.4.3 Design and plan pedestrian networks to provide attractive, direct routes between the transit station and other area destinations

- Maximize pedestrian priority in station areas to facilitate access and circulation to and within the transit station. Ensure pedestrian priority corridors and crossings follow desire lines with features such as traffic signals, 'scramble' crossings, and grade separation.
- Design or maintain clear view corridors along sidewalks connecting to the transit station and important civic buildings and landmarks.
- Coordinate paving materials and paving patterns with that of the adjoining public right-of-way.
- Minimize private driveway crossings over pedestrian circulation routes wherever possible. Locate them off of rear laneways or side streets whenever feasible.
- Furnish the pedestrian network with a minimum level of amenity, including elements such as:
  - Weather protection on adjacent sidewalks in developments with frontages on pedestrian corridors;
  - Coordinated street furniture programs that reflect the vision and character of mobility hubs and provide seating, sheltered waiting areas for transit, light standards and waste/recycling receptacles;
  - Minimum standards provision of street trees to ensure tree health; and
  - A signage system throughout mobility hub areas directing users to key destinations and transit stations.

Benefits

- Provides a safe and attractive pedestrian environment.
- Encourages walking as a comfortable and desirable mode choice.
- Supports ground-level uses, such as retail, along major pedestrian corridors.
- Reduces the need for car related infrastructure.
- Promotes healthy lifestyles through greater physical activity.

Applicability

- While it is most crucial to provide an attractive pedestrian environment in the primary zone, the safety and comfort of pedestrians should be ensured throughout the secondary and tertiary zones as well.

Tools & Resources

- Canadian Transport Agency Guide for Passenger Terminal Accessibility (2007)
- City of Toronto Accessibility Design Guidelines (2003)
- CNIB Clearing Our Path - Universal Design Recommendations for People with Vision Loss (2009)
- Final Proposed Accessible Built Environment Standard (2010)
- Standards for Barrier-Free Design of Ontario Government Facilities (2006)

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

2.4.4 Build and retrofit the pedestrian environment to meet or exceed accessibility guidelines and standards (see "Tools & Resources" box)

- Design pedestrian infrastructure to create a barrier-free, accessible pedestrian network.
- Minimize physical barriers for accessing buildings as much as possible to facilitate accessibility.
- Sidewalk width should relate to its function (i.e. main retail street vs. residential) and be designed to accommodate the anticipated amount of pedestrian traffic.
  - » Ensure that a straight, unobstructed, clearway of a minimum width of 2.0 metres is provided on sidewalks in major pedestrian areas
- Construct and retrofit pedestrian crossings with curb ramps. Avoid continuous ramps around corners so that different crossing paths can be identified by the visually impaired.
- Ensure the safety of persons with vision impairments by providing attention indicators at the transition between sidewalk and road.

2.4.5 Develop the pedestrian environment to maximize safety and security

- Incorporate pedestrian-scale lighting at regular intervals in areas of high pedestrian activity and at crosswalks, bus stops and corners.
- Provide clearly marked crosswalks at intersections and protected mid-block crossings throughout mobility hub areas.
  - » Blocks longer than 150 metres should include safe, clearly demarcated mid-block pedestrian crossings, with traffic signalization if warranted.
  - » Pedestrian crossings should be raised and/or sidewalk finishes should be extended through the intersection, providing a strong cue to drivers that the crosswalk is part of the pedestrian realm. Raised pedestrian crossings must be made safe and accessible for all users.
- Identify locations of pedestrian/vehicular conflict along all pedestrian corridors and create mitigation strategies, including traffic calming and signalized crossings.
- Where it will not interfere with bus transit operations, curbs should include build-outs the width of the parking lane to reduce pedestrian crossing times.
- Where possible, building setbacks should be modulated at intersections to create plazas to improve visibility at intersections and to create well-defined, usable public spaces.

2.4.6 Provide for traffic calming measures in street design. 2.3

- Provide horizontal deflection methods, such as narrower lanes (less than 3.65 metres in width), chicanes, mid-block extensions, traffic circles and designated bicycle lanes.
- Incorporate visual cues such as signage, regularly spaced street trees, light standards and banner poles, medians and on-street parking.

FIG 2.21 King Street, Kitchener: The sidewalk width on this residential street is proportional to its high level of pedestrian activity & mixed-uses.

FIG 2.22 Kitchener, Ontario: Lighting on street trees provides visual interest and improve the night-time pedestrian experience.

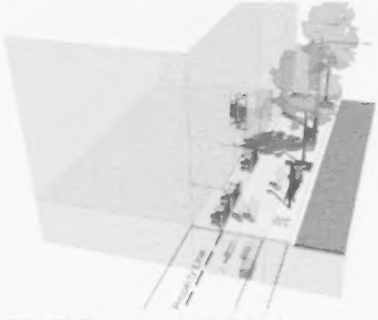


FIG 2.23 Recommended widths and treatments for sidewalk zones in different urban environments: City of Calgary, TOD Guidelines.

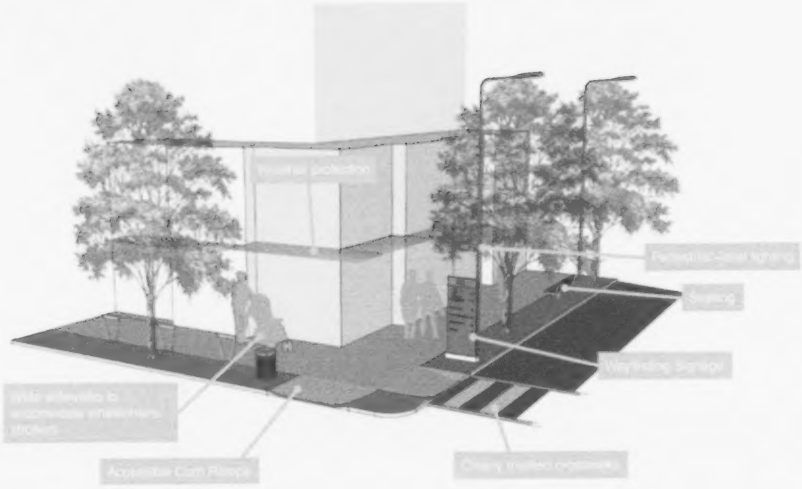


FIG 2.24 Design considerations for the pedestrian environment.

FIG 2.25 Narrower drive lanes, bike lanes, on-street parking, trees, banner and light poles.

FIG 2.26 Centre median, mid-block demarcated pedestrian crossing, curb bulb-outs, median trees and pedestrian refuge.

FIG 2.27 Small curb radius, raised intersection, demarcated pedestrian crossing, curb bulb-outs and prioritized signalization.

2.5 Create cycling-supportive streets and communities. 1.3 2.5

Approaches

2.5.1 Develop a bicycle network that increases safety of cyclists and positions cycling as a competitive mode choice.

- Identify cycling priority corridors on routes to transit stations and between major destinations.
- Close gaps between local and regional cycling networks and provide connections to transit stops and stations.
- Identify routes that are more attractive to cyclists on which to place cycling facilities such as trails, bike lanes, and cycle tracks. These include routes that:
  - » Have lower travel speeds and/or vehicular volumes;
  - » Provide a lower grade where elevation changes occur;
  - » Follow travel demand patterns and serve multiple destinations, including shopping, schools, libraries, and parks; or
  - » Serve as a shortcut to major destinations.

2.5.2 Provide minimum bicycle parking requirements in zoning bylaws.

- Define different requirements for different uses:
  - » Retail uses require a greater proportion of short term bicycle parking near building entrances.
  - » Residential areas require long-term, secure parking that can be accommodated in bicycle rooms.
  - » Offices require a mix of both short-term and long-term bicycle parking for both visitors and employees.
- Link requirements to the size of development and the number of vehicular parking spaces required.
  - » Define higher standards in areas within a five-minute walk of transit stations or major bike facilities, such as bike lanes and off-street trails.
- Define requirements for bicycle amenities such as showers, change rooms, and lockers.
- Respond to seasonal peaks in bicycle parking and amenity demand by allowing seasonal bicycle parking in on-street or off-street parking spaces.

Benefits

- Encourages cycling as a mode choice.
- Reduces need for vehicular travel, particularly for short trips within mobility hub areas.
- Ensures appropriate and plentiful bicycle parking to improve security.
- Provides amenities, such as change and shower facilities, to support cycling.

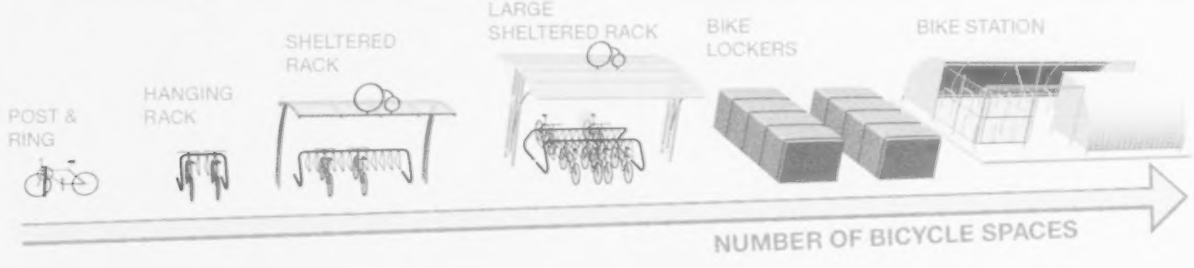
Applicability

- Plan and design cycling routes according to cycling commuter patterns which often extend far beyond the tertiary zone.

Consider bike share programs in mobility hubs where:

- Multiple major destinations are within an 800-metre radius of transit station.
- A bicycle network is developed to serve destinations with bicycle lanes or greater priority.

Bicycle Parking Options



Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

2.5.3 Implement bike sharing programs to bridge the gap between destinations and rapid transit.

- Ensure bike share programs provide a minimum level of access between transit stations and major destinations in proximity to transit stations.
- Require major new developments to contribute to the expansion of a bicycle share program, where one exists.
- In areas with well-developed bicycle facilities, provide bicycle share programs year-round. Where only seasonal use of bicycles is expected, use on-street parking spaces for bicycle-share stations.
- Explore innovative approaches to finance and operate bicycle share programs.
  - » Design bicycle-sharing programs to offset costs through user fees, sponsorships, or advertising, to ensure financial viability and to fund expansion.
  - » Where a local agency does not exist, or is unable to implement and maintain a bike share program, consider guaranteeing loans for start up costs of systems by outside companies.

Case Study

FIG 2.28 BIXI Bike Station in Montreal.

BIXI BIKE SHARING PROGRAM
MONTREAL, QC

- Inspired by the largest bike share system in the world, Paris's Vélib.
- Developed in 16-months and launched by Public Bike System Co., a non-profit subsidiary of Stationnment Montréal (Montreal Parking Authority).
- Started with 3,000 bicycles in bike stations located throughout downtown Montréal, no further than 300-metres apart.
- Expanded to 5,000 bicycles by the end of the first season of operation in 2009.
- System has now been exported to Gatineau, Toronto, Melbourne, AU, and London, UK, among others.

Case Study

ZONING BYLAW REQUIREMENTS FOR BICYCLE PARKING AND AMENITIES ACROSS CANADA

A number of Canadian municipalities, including Vancouver, Victoria, Edmonton, and Toronto, have included bicycle parking requirements in their zoning bylaws. In most cases, the bicycle parking requirement is tied to the use (residential, office, retail) and size or number of units in a development. In Edmonton, a blanket approach is adopted, where 5% (20% in the downtown) of the total parking spaces required must be provided as bicycle parking. Most bylaws also provide minimum standards for bicycle parking spaces and define bicycle parking types, whether they be sheltered, in a bicycle room, or with in the public right-of-way.

In addition to bicycle parking requirements, some municipalities have also added requirements to provide amenities to cyclists, such as change rooms, showers, and locker facilities. Vancouver includes these requirements in its Building Bylaw. Shower and changing facilities are required for non-residential buildings where more than four Class A bicycle parking spaces are required in the parking bylaw (3.7.2.11, City of Vancouver Building Bylaw). In the City of Toronto's proposed new Zoning Bylaw (Section 230), shower and change facilities will be required in buildings containing uses other than dwelling units where there are more than five bicycle parking spaces required (Proposed Zoning Bylaw, 230.5.1.20(5)).

2.6 Adopt goods movement strategies within mobility hubs that support complete streets, while ensuring the efficient delivery of goods and services. 2.3

Approaches

2.6.1 Identify a strategic network for goods movement and deliveries to reduce potential conflicts between trucks, personal vehicles, transit, pedestrians and cyclists.

- Ensure the mobility hub goods movement network is efficiently connected to the regional goods movement network.
- Locate trucking routes away from transit, pedestrian and cycling routes.
- Focus deliveries outside of peak period.

2.6.2 Ensure design of servicing and loading areas does not interfere with the pedestrian network and reduce the visual impact on the streetscape.

- Servicing and vehicular traffic should be shared and coordinated between adjacent developments to minimize the number of driveways.
- Locate loading and service areas away from sidewalks and on rear lanes or side streets.
- In congested urban areas with high demands for freight deliveries and inadequate supply of courier parking, designate loading and delivery curbside parking spaces. 4.4
- Visually screen loading areas adjacent to streets with vegetation and decorative fencing.

2.6.3 Consider off-site receiving alternatives

- Consider the establishment of consolidation centres to reduce freight movement inside the mobility hub (see TFL London Construction Consolidation Centre report).
- When appropriate, establish "Just-in-Time" deliveries with off-site receiving systems for time-sensitive goods.
  - » Goods are received and consolidated off-site so that fewer, more timely and more efficient deliveries can be made to the location of use.
  - » This strategy minimizes demand for delivery and storage space at the point of use and reduces truck traffic.
- Develop un-staffed package drop-off stations in centralized locations for flexible delivery schedules.
  - » Locate stations in accessible locations among clusters of residential developments, offices and/or small businesses.

Benefits

- Optimizes movement of truck traffic in mobility hub areas.
- Reduces impact of loading and servicing on pedestrian environment.

Tools and Resources

- Transport for London - Kerbside Loading guidance (2009)
- Transport for London - London Construction Consolidation Centre Final Report (2008)

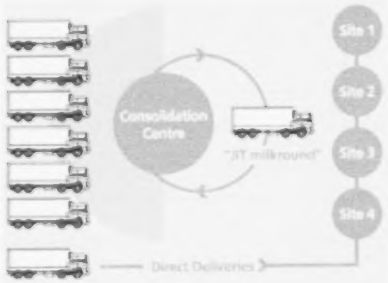


FIG 2.29 Consolidation centre diagram.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

FIG 3.1 Attractive, efficient, and understandable station spaces like Liverpool Street Station in London are key to a high-quality user experience.

A well-designed transit station for a high quality user experience.

The transit station will be a focal point in mobility hub areas, as the gateway to the regional transit network. Its design will be paramount to ensure a seamless, accessible, and attractive customer environment and experience.

THEME ONE

CREATING HIGH QUALITY TRANSIT STATIONS

3.1 Encourage high-quality station architecture and public realm that are sensitive to the surrounding built context and community vision.

THEME TWO

VALUE-ADDED CUSTOMER AMENITIES

3.2 Develop a station retail program that is responsive to customer demand, convenience, and market needs.

3.3 Provide a high level of customer amenity to enhance customer comfort, safety, and information.

THEME THREE

UNDERSTANDABLE STATIONS AND STATION SPACES

3.4 Create understandable and accessible transit stations through consistency and clarity in station entrances and interfaces, spaces, layout, and visual cues connected by barrier-free movement spaces.

3.5 Develop wayfinding and signage to support the efficient navigation of the transit station and station area.

3.1 Encourage high-quality station architecture and public realm that are sensitive to the surrounding built context and community vision.

3.3 6.1 9.2 9.5

Approaches

3.1.1 Involve community members, leaders, and professionals throughout the station design process.

- Provide opportunities for design charrettes and citizen input in the development of a station vision and conceptual design.
- Continue dialogue throughout the station design process for constant feedback to ensure initial vision is achieved.

3.1.2 Ensure that station designs reflect the community vision and context.

- Integrate community vision, either existing, or developed, into station architecture and design.
- Preserve and/or integrate historic elements where they exist and are in proximity to the station site.
- Integrate local architectural elements, such as building materials, colours, and vegetation.

3.1.3 Choose station designs that are durable and timeless, while advancing architectural standards in the station area.

- Encourage excellence in station architecture through design competitions and peer-reviewed design panels.
- Evaluate station architecture and design for timelessness and durability – avoid design fads or use of elements that may require added maintenance.

Benefits

- Creates landmark that serves as a focal point in the mobility hub area.
- Improves image of transit in the community.
- Increases the desirability of the area and encourages development.
- Provides a precedent to encourage a high standard of architecture in station areas.

FIG 3.2 Hamilton GO Station is a remarkable example of the reuse and revitalization of a historic landmark in the community as a transit station by preserving the original station building.

FIG 3.3 Museum Station's renovation project, involving community groups, brought the context of the museum to the station platform level.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

3.1.4 At rapid transit stations, provide safe, convenient and efficient connections to regional and local transit services. 1.1

- Ensure that the needs of persons with disabilities are considered by including the participation of specialized consultants, disability advocacy groups, or by forming an accessibility advisory group.

3.1.5 Provide safe, clear and efficient pedestrian connections between the station and the rest of the mobility hub. Design pedestrian connections to: 1.3

- Provide universal access;
- Accentuate linkages to primary pedestrian corridors using paving patterns;
- Use landscaping elements to reinforce traffic patterns; and
- Include coordinated wayfinding signage.

3.1.6 Wherever possible, provide transfers and pedestrian connections on the same level. When designing compact stations, or to overcome physical barriers, grade separations may be necessary and should be furnished with ample points of vertical circulation, including stairs, escalators, ramps, and elevators.

3.1.7 Locate stations so that they can be highly visible along primary pedestrian corridors. Avoid blocking view corridors with walls or landscaping.

3.1.8 In station areas, include public plazas with community amenities such as gathering places, public information kiosks, public art displays and opportunities for small convenience-oriented retail uses.

3.1.9 Design station areas to ensure user safety and security by:

- Maintain clear sight lines between waiting areas and the surrounding neighbourhood;
- Provide consistent lighting;
- Provide more than one accessible entrance or exit to ensure that persons with disabilities have safe and direct access routes even in case of maintenance or breakdown of equipment;
- Ensure more than one access or exit to allow for alternate emergency routes; and
- Facilitate natural surveillance (also known as 'eyes on the street') by fronting the station area with mixed-use buildings with street front retail and residential above-grade.

3.1.10 In waiting areas, include a variety of comfortable seating types and locations.

FIG 3.4 Not desirable: Secluded station entrances create an unsafe environment. Littleborough Station, Manchester, UK.

FIG 3.5 Design themes and public spaces can make a station more inviting and visibly interesting. Canary Wharf Station, London, UK.

FIG 3.6 Seating and clear sight lines provide a more enjoyable experience to travellers. Curitiba, Brazil.

3.1.11 Ensure high-quality and welcoming station design by providing the following:

- Variety of spaces for waiting, gathering and travel inside and outside the stations;
- Multiple barrier-free access points and waiting areas;
- Use of interesting, durable and carefully designed architectural detailing, materials and finishes; and
- Use of a coherent design theme reflective of the local character of the surrounding neighbourhoods.

3.1.12 Use universal design principles to inform station area design as to ensure accessibility for all segments of the population. 3.4

3.1.13 Use fountains, landscaping and building elements (such as low walls) to buffer traffic noise.

3.1.14 Incorporate natural landscape elements and other green design features such as drought-resistant plantings, permeable surfaces and recycled/able materials. 7.0

3.1.15 Include bicycle facilities in all station areas. Bicycle racks and storage should be highly visible, easily secured and weather protected. Connections to the mobility hub bicycle network should be emphasized and continued into the station area. 1.4

FIG 3.7 Accessible platform at GO Transit Station.

Architectural Precedents for Transit Stations

FIG 3.8 Highly visible stations promote connections to TOD and other transport services. Vauxhall Cross Station, London, UK.

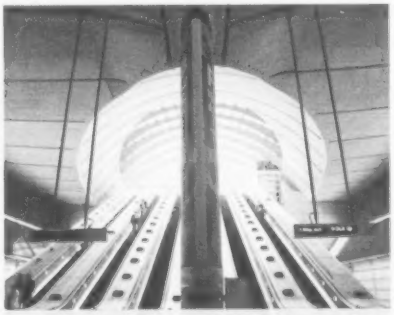


FIG 3.9 Architectural features can bring in natural light to underground station. Canary Wharf Station, London, UK.

FIG 3.10 Designs may be bold, though should also be timeless. Expo Station, Singapore.

FIG 3.11 Natural features can be incorporated both indoors and outdoors. Atocha Station, Madrid, Spain.

FIG 3.12 Use of lighting and creative design to highlight circulation paths. Solna Centrum, Stockholm, Sweden.

FIG 3.13 Bicycle station with its own high architectural features. Outside Union Station, Washington, DC.

3.2 Develop a station retail program that is responsive to customer demand, convenience, and market needs.

Approaches

3.2.1 Identify mobility hubs as retail areas and centres in secondary and official plans to encourage the location of retail uses at transit stations.

- Increases retail market potential by clustering regional retail uses at mobility hub stations.

3.2.2 Conduct retail market analysis at transit stations to develop a clear, realistic station retail program.

- Conduct market surveys prior to developing a retail program to create a retail use mix appropriate to meet demands of customers.
- Identify potential markets and demand to inform size, layout, and locational strategies within stations.
- Explore opportunities, such as exclusivity contracts, in return for guaranteeing retail uses in stations.
  - » "Package" retail opportunities for multiple transit stations to leverage leasing demand at high-traffic stations to include meeting retail needs at smaller stations.

3.2.3 Locate retail spaces within transit stations in high-traffic locations to create financially attractive business opportunities.

- Retail uses should be highly visible from, or located in, high traffic-locations, including station entrances, plazas, waiting areas, and major movement corridors.
- Retail uses can create visual interest and provide passive surveillance in station areas.

Benefits

- Raises station profile as a destination in the transit network.
- Provides animation and greater activity at transit stations.
- Maximizes potential revenue from leasing station retail space.
- Provides retail and service opportunities that allow customers to minimize need for additional discretionary trips such as shopping, banking, and leisure.

Applicability

All mobility hub stations

- This guideline should be prioritized at stations without retail amenities and where few retail opportunities exist within a walking distance of the transit station.

FIG 3.14 [Good] Convenience stores can provide the base needs for most transit commuters.

FIG 3.15 [Better] Integrating food and retail into station spaces can provide visual interest and greater comfort.

FIG 3.16 [Best] Creating a destination retail/food court space attracts non-transit users to station buildings.

3.3 Provide a high level of customer amenity to enhance customer comfort, safety, and information.

Approaches

3.3.1 Launch a Station Manager program at stations to respond to customer concerns and coordinate customer service, maintenance, supervision, and community relations initiatives at stations.

- Establish minimum standards for station cleanliness and maintenance with mechanisms for reporting unsatisfactory conditions.

3.3.2 Provide a minimum level of amenity to satisfy the three key needs for customer amenity.

- **Convenience:** Provide retail opportunities at transit stations to offer food, drink and services such as banks or dry cleaners.
- **Comfort and Safety:** Transit stations should provide comfortable and secure places to sit and wait with amenities such as washrooms and secure bike storage.
- **Information:** Provide a high level of customer service at stations, including staffed customer service kiosks, real-time and static information displays, wireless internet and pay telephones.

3.3.3 Provide accessible real-time information on service information, including arrivals, delays and service alternatives, throughout the transit station and at major transit stops and transfer locations in mobility hub areas.

- Provide access to system-wide real-time transit information from across the region to allow customers to plan regional trips and advance notice of service disruptions or delays.
- Integrate community information, such as news, event listings, and public service messages into real-time information program.
- Ensure information is provided in accessible formats for persons with disabilities, such as visual and audible platforms

Benefits

- Improves the customer experience when at stations, particularly when waiting for transit services.
- Provides a standard level of customer service and amenity with mechanisms for accountability and coordination.
- Provides greater customer comfort while at transit stations by providing opportunities to rest, refresh, and get assistance.
- Information standards can provide greater certainty to transit customers through real-time information and in-person assistance.
- Increases the attractiveness and comfort of station buildings and areas.

FIG 3.17 Plentiful and comfortable seating in Los Angeles Union Station provides customers with a desirable place to sit and wait.

FIG 3.18 Free time-limited internet stations allow customers to quickly check email or read the news.

FIG 3.19 The food court at Grand Central Station in New York is a hive of activity around the clock.

FIG 3.20 Information kiosks should be clearly visible and well organized.

FIG 3.21 Real-time service information should be provided at waiting areas.

Customer Amenities at Mobility Hubs

Bicycle / Parking Facilities

FIG 3.22 Not desired: Insufficient, unprotected, or inconvenient bicycle parking spaces.

FIG 3.23 Good: Basic sheltered bicycle parking provides security and weather protection.

FIG 3.24 Best: Staffed bike stations with secure storage, lockers, rentals & change facilities.

Waiting Areas

FIG 3.25 Not desired: Waiting areas without seating or weather protection.

FIG 3.26 Better: Weather protected boarding areas with seating & heated station building with real-time information at Union Station Bus Terminal.

FIG 3.27 Best: Comfortable seating areas with real-time information and access to amenities, such as this bus station at Montmorency Station in Laval, QC.

3.4 Create understandable and accessible transit stations through consistency and clarity in station entrances and interfaces, spaces, layout, and visual cues connected by barrier-free movement spaces.

3.2 3.3 3.5

Approaches

3.4.1 Be aware of different user groups at transit stations when designing transit stations and design-in approaches to improve user experience.

- **Persons unfamiliar with the station**, such as tourists, or new customers: use universal language and symbols for signage, ensure logical layout.
- **Persons with visual disability:** provide information in Braille, high contrast signage and materials, audio cues and signage, tactile navigation strips.
- **Persons with hearing disability:** supplement audio announcements with visual displays.
- **Persons with intellectual, developmental, or learning-disabilities:** provide opportunities for passenger assistance through station attendants with accessibility training.
- **Persons with physical disabilities:** create barrier-free station spaces and include redundancies in station design to provide multiple alternatives for persons with disabilities.

3.4.2 When developing stations, be mindful of, and design to reduce or mitigate the following barriers to legibility, permeability, and accessibility:

- **Architectural or physical barriers:** building or space features that create problems for people with disabilities or the legibility of a space.
- **Information or communications barriers:** features that impact a users' understanding of information.
- **Attitudinal barriers:** typically related to customer service and discrimination or assumptions based on disabilities.
- **Technology barriers:** when technological features of a station or space are not designed to accommodate needs of different users.
- **Organizational barriers:** policies, regulations, or procedures that detract from customer service or users' ability to use the station.

3.4.3 Develop plans to retrofit existing, non-accessible transit stations and stops in a timely and cost effective manner.

- Prioritize station retrofits based on ridership, destinations, and identified customer needs.
- Ensure that all new transit stations be fully barrier-free and accessible and demonstrate best practices in accessible design.

3.4.4 Identify and create barrier-free movement areas and desire lines in stations and station areas.

- Remove barriers along desire lines to reduce congestion and improve movement between station areas.

Benefits

- Creates clear and navigable transit stations.
- Provides accessibility for all user groups.
- Improves the physical interface between stations and their surroundings.
- Reduces congestion by ensuring orderly layout and movement through station areas.

Applicability

All Mobility Hubs

FIG 3.28 Movement areas within stations should be free of obstacles and provide clear routes between station activity areas.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

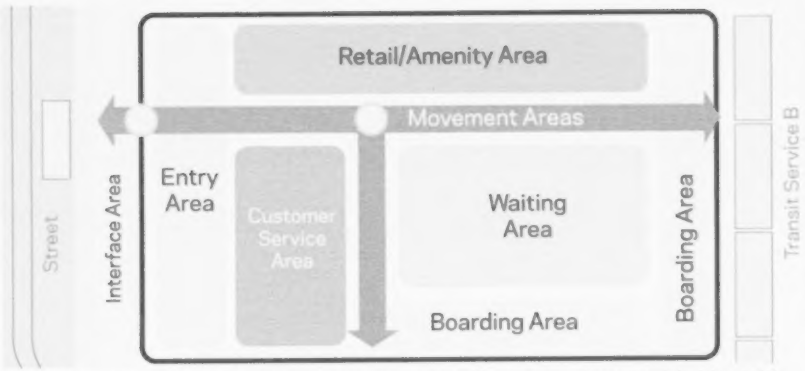


FIG 3.29 Generalized layout of various station areas and resulting movement areas and decision points. Use similar layout exercises with new and existing stations to identify functional areas and strategies to improve station operation.

FIG 3.30 Station retail spaces should be located along busy corridors.

3.4.5 Ensure station areas and amenities are laid out consistently and logically through a consistent hierarchy of station spaces with clear and barrier-free "movement areas" linking these zones.

- Interface and entry areas: should be visible from street and pedestrian paths and clearly marked. Signage, such as entry pillars, must be provided where entrances are hidden from view. Ensure specialized transit service areas are located adjacent to barrier-free entrances and movement spaces.
- Customer service areas: should be located centrally in order to be accessed by users on both sides of the fare-paid line.
- Retail/amenity areas: should be located along the main movement areas of the station to increase accessibility and visibility. Retail areas should not conflict with main movement areas. Provide appropriate spaces for signage and queuing.
- Waiting areas: should not conflict with main movement areas and should offer clear views of boarding areas.
- Boarding areas: should be clearly marked and provide areas for alighting and queueing.
- Identify **'decision points'** (FIG 3.29), locations where conscious choices in navigation are made, in station areas where additional directional signage and visual cues are needed to assist in this navigation.

3.4.6 Use visual elements, such as lighting, daylight, building materials, and colour contrast to create 'beacons' of navigation and understandability.

- Use daylight to assist in navigation, particularly at access points to underground stations or tunnel areas. Provide consistent levels of artificial lighting in customer areas to improve visibility and security.
- Maintain consistent approaches to accessible features in order that customers with disabilities can travel more easily from one service to another.

3.4.7 Identify and create barrier-free movement areas and desire lines in stations and station areas.

- Remove barriers along desire lines to reduce congestion and improve movement between station areas.

3.5 Develop wayfinding and signage to support the efficient navigation of the transit station and station area.

Approaches

3.5.1 Implement a minimum standard of wayfinding signage in transit stations, including:

- **Station identification signage** at station interface and entrances.
  - » Indicate station name, agencies and modes served.
  - » Mark accessible entrances with the universal accessible symbol.
  - » Provide directions to nearest accessible entrance at non-accessible entrances.
- **Directional signage** at decision points, station entrances, and in movement areas.
  - » Locate directional signage at junctions along walkways, at station entrances/exits, and at navigational barriers.
  - » Signage should be clear and consistent within stations and information grouped by station features, such as street exits, transit services, and amenities.
  - » Provide direction to accessibility features, such as barrier-free entrances/exits, elevators, and escalators.
  - » Ensure signage related to safety, such as signage indicating emergency exits, is unobstructed and clearly visible.
- **Accessible wayfinding features** throughout transit stations to assist persons with disabilities
  - » Use navigational strips and tactile signage to assist customers with visual disabilities throughout the station.
  - » Provide passenger assistance phones or help stations at station entrances, boarding areas, and at decision points.
  - » Provide direction and information on accessible alternatives when accessible features are unavailable.

3.5.2 Maintain standardized identification and terminology throughout transit systems, modes and routes, including a common, tested signage standard.

- Wherever possible, use pictographs or icons to represent or supplement information provided in signage.
- Adopt tone and style in directional and information signage that reflects the customer-focused experience at transit stations.

3.5.3 Include signage in wayfinding programs that highlight sustainable and innovative programs and features

- Provide direction to carpool lots, bicycle parking, and other 'green' modes of station access.
- Highlight station programs, such as car-sharing or bike-sharing in station areas and provide information on sustainable transportation amenities and networks.
- Use signage as educational tools to demonstrate innovative design features in stations and station areas, such as environmental or conservation efforts in a facility.

Benefits

- Improved navigation in station areas, especially in complex stations and for unfamiliar users.
- Improved customer experience, service, and safety.
- Greater accessibility through the mitigation of navigational and physical barriers.

Applicability

All Mobility Hubs

- Extend coordinated wayfinding programs along rapid transit corridors beyond the mobility hub.
- Signage should supplement, not replace, logical and proper design and layout of transit stations.
- Due to the high visibility of signage in transit stations, it is important that it be thoughtfully designed and located to maximize its impact while providing a positive image of mobility hubs and transit stations.

Toolbox & Resources

- TCRP Report 12: Guidelines for Transit Facility Signing and Graphics
- Wayfinding in Metro Vancouver: Eleven Ideas
- Transport for London: Standard for TfL Products

Wayfinding Design Considerations

FIG 3.31 Use a common pillar sign to mark station entrances, especially if it is obscured or located within buildings.

FIG 3.32 Not desirable: Cluttered and inconsistent directional signage can confuse users.

FIG 3.33 Identify decision points in station navigation and provide directional signage.

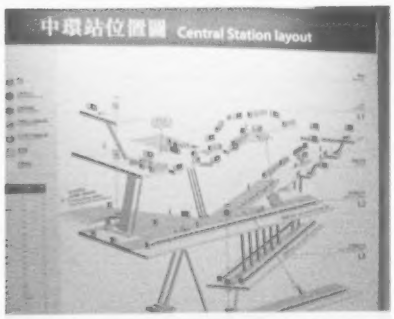


FIG 3.34 Use station layout maps at entry areas to improve station navigation, especially at complex interchanges.

FIG 3.35 Signage at transit stops should be well marked, provide schedule and service information and area maps.

FIG 3.36 Secondary station names based on colours, letters, and numbers can improve legibility for non-English users.

FIG 3.37 Provide clear directional signage along movement spaces. Ensure information is hierarchical and relevant.

FIG 3.38 Provide station context maps at station entrances to help users navigate to and from area destinations.

FIG 4.1 Structured commuter parking well integrated with multi-modal transit station at Shudehill Interchange, Manchester, England.

Strategic parking management.

A progressive approach to parking management and reduction will encourage sustainable mobility and create opportunities to build compact, people-oriented communities.

THEME ONE

RIGHT-SIZING COMMUTER PARKING

4.1 Assess commuter parking needs on a corridor or system basis and locate and design parking to maximize development and ridership potential at transit stations.

4.2 Limit commuter parking expansion by prioritizing feeder transit services to mobility hub stations.

4.3 Implement commuter parking pricing with incentives for carpooling and alternative fuel vehicles.

THEME TWO

AN AREA-BASED APPROACH TO PARKING MANAGEMENT & REDUCTION

4.4 Develop a short and long term area-wide parking strategy with maximum and minimum parking standards and shared use parking practices.

4.5 Implement parking pricing strategies as part of an overall transportation demand management program.

THEME THREE

PARKING DESIGNED TO HIGH STANDARDS

4.6 Minimize surface parking and integrate parking within surrounding development and parking structures.

4.7 Design parking facilities to a high level of architectural and landscape quality to reduce negative impacts on the environment and streetscape.

4.1 Assess commuter parking needs on a corridor or system basis and locate and design parking to maximize development and ridership potential at transit stations. 1.3 2.1 2.2 9.2

Approaches

4.1.1 Assess commuter parking demand at mobility hub stations in context of adjacent stations.

- Where feasible, locate commuter parking at nearby stations to reduce required supply at mobility hubs.
- Where the reduction of parking demand at mobility hub stations is not made possible by locating parking at adjacent stations, consider establishing a secondary station in an area with lower development potential.
  - » Particularly applicable in situations where the mobility hub is a terminus station in a context with high levels of park-and-ride access.
  - » Ensures parking is minimized at primary mobility hub station with greater development potential while meeting commuter demand needs.
  - » Maintains level of choice for customers accessing rapid transit by commuter parking as they will drive to nearby stations with greater parking supply

4.1.2 Identify areas within mobility hub areas with low development potential as possible locations for required commuter parking.

- Hydro corridors are identified as locations where transit commuter parking is an allowable secondary use.
- Lands with lower development potential such as those abutting highways, hydro corridors, and, in some cases, rail corridors provide an opportunity for commuter parking to serve as visual or noise buffers.

4.1.3 Open opportunities for development directly adjacent to transit stations by locating commuter parking further from stations, within a comfortable walking distance.

- Commuter parking does not have to be directly adjacent to a transit station.
- Identify opportunities for establishing satellite parking facilities or relocate existing commuter parking away from station areas.
- Ensure comfortable pedestrian connections and environment from commuter parking to station entrance.

Benefits

- Opportunity to reduce commuter parking at mobility hub stations.
- Decreased traffic congestion around station areas.
- Encourages walking or cycling.
- Potential for additional revenue through sale/lease of commuter parking lands.
- Increased ridership potential and demand from development of commuter parking lands.
- Provides flexibility for phased intensification of commuter parking areas.
- More efficient use of otherwise undevelopable lands, such as hydro corridors.

Applicability

- Mobility hubs where commuter parking is provided or is being considered.
- This guideline should be prioritized:
  - » Where there is significant development potential, such as urban growth centres; and
  - » Where there is potential for improved feeder transit services.
- This guideline should also be applied in determining whether additional commuter parking is justifiable, such as at terminus stations.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

4.1.4 Adopt a modular design approach to commuter parking by breaking up expanses of parking into block-sized parcels of approximately 300 spaces, separated by pedestrian and cycling spines to the transit station. S3 S4 S5 T1 T2

- Parceled approach limits need for multiple access points, provides opportunity to phase in development, and improves physical appearance of parking areas by providing space for vegetation and buffers.

4.1.5 Adopt more compact parking standards to reduce land requirements.

- Reduce standard parking space dimensions and minimum parking aisle widths
- Consider adding small car spaces at locations closer to station entrances to encourage use of efficient vehicles

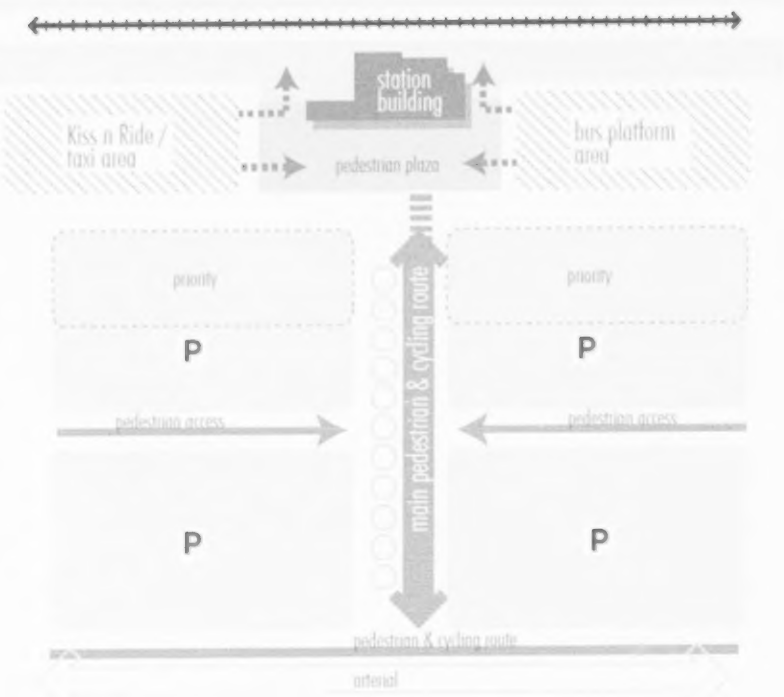


FIG 4.2 By applying a parceled parking approach with compact parking dimensions, a small decrease in parking spaces can improve the pedestrian environment and open up opportunities for development

Case Study

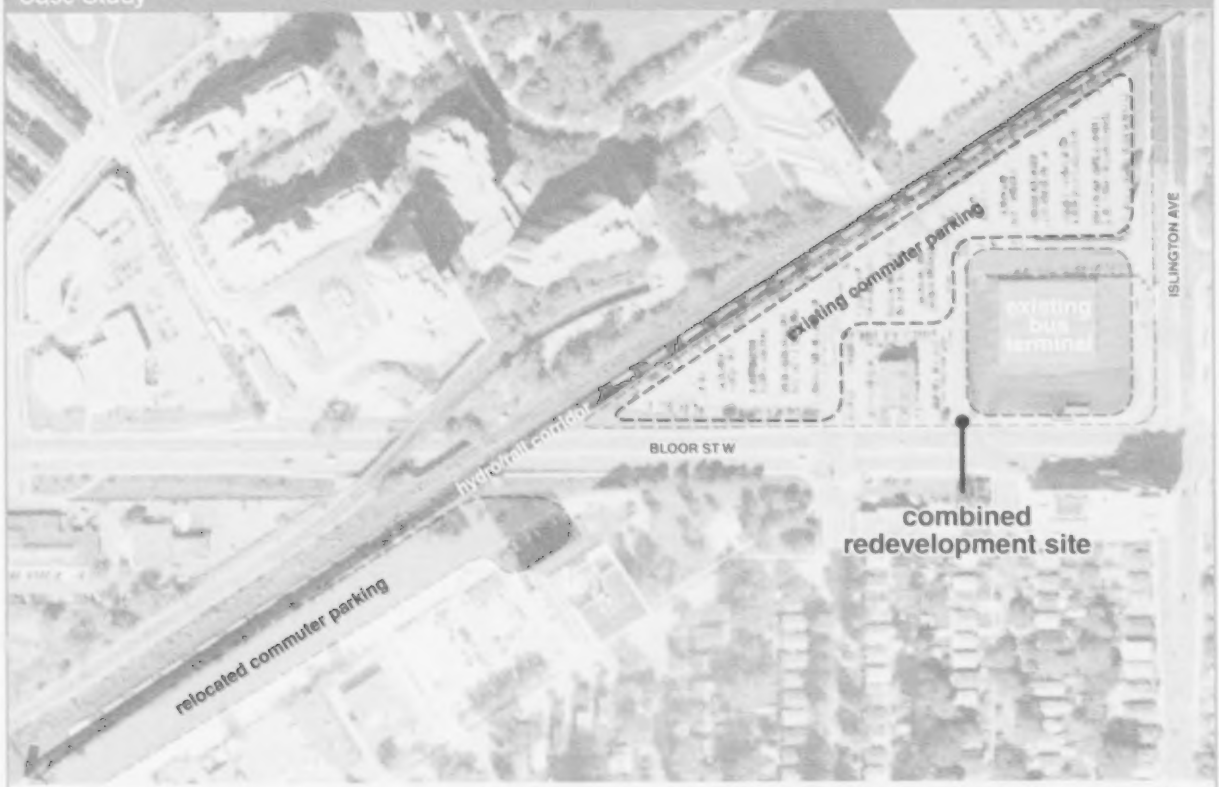


FIG 4.3 Overview of Islington Station area showing relocated commuter parking along hydro/rail corridor and consolidation of land for future development, Toronto, Ontario.

CREATING DEVELOPMENT OPPORTUNITIES THROUGH COMMUTER PARKING RELOCATION
ISLINGTON STATION, TORONTO

- Redevelopment opportunity identified at station on Mississauga Transit bus terminal lands (to be vacated) and existing commuter parking lot.
- Commuter parking relocated along hydro/rail corridor, within walking distance of station entrances
- Allows for a larger and continuous parcel of land for redevelopment above subway station.

4.2 Limit commuter parking expansion by prioritizing feeder transit services to mobility hub stations. 1.2 1.5 4.1

Approaches

4.2.1 Review local transit networks to provide regular feeder transit service that is coordinated with rapid transit services.

- Establish minimum service standards to ensure transit service is available during rapid transit service hours and trip times. 1.2
- In 'hub and spoke' radial transit networks, local transit centres and interchanges should be established at mobility hub stations to maximize destinations and provide regular service.
- In grid-based transit networks, prioritize mobility hub transit stations when considering route deviations from the local grid.
- Where multiple transit agencies serve a mobility hub, service integration should be encouraged to maximize available transit service, especially along shared corridors into transit stations. 1.1 1.2

4.2.2 Conduct a cost benefit analysis on providing additional commuter parking versus investing in additional operating funds to feeder transit service.

- Base analysis on the capital and operating costs of a parking space compared to the operating cost of transit service in order to attract an equal number of users to each transit station.

4.2.3 Negotiate developer subsidies to fund feeder transit service in new developments and subdivisions.

- Allows for the provision of transit service in areas where it otherwise is not warranted.
- Funding can be negotiated through development agreements or assessed as a portion of development charges.

Benefits

- Reduced demand for commuter parking supply.
- Improved financial viability of feeder transit services.
- Reduced capital and operating costs associated with commuter parking.

Applicability

All Mobility Hubs

- Commuter parking expansion may be preferred in emerging mobility hubs to encourage transit ridership in the short term; however, feeder transit should be provided at the earliest opportunity.
- Feeder transit improvements are especially important where walking and cycling is not a feasible option due to inadequate or unattractive walking/cycling environments.
- Transit services should be reviewed for an extended zone of influence beyond mobility hubs – based upon the catchment area for the rapid transit station.

Legend

Especially Relevant Urban Typologies

U1 CENTRAL TORONTO
U2 URBAN TRANSIT NODES
U3 EMERGING GROWTH CENTRES
U4 HISTORIC SUBURBAN TOWN CENTRES
U5 SUBURBAN TRANSIT NODES
U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

T1 ENTRY
T2 TRANSFER
T3 DESTINATION

Cross-reference

ALSO REFER TO GUIDELINE

4.2.4 Transit routes should provide short and direct trips to mobility hubs to provide a competitive alternative to park and ride.

- Coordinate and route services in conjunction with transit priority measures. 1.3

4.2.5 Use marketing promotion and outreach programs to publicize feeder services.

- Conduct individualized marketing programs at rapid transit stations and in households and offices along feeder service routes as part of larger transportation demand management programs.
- Position branding and marketing for feeder services to reflect positive benefits of using feeder services, such as the convenience and time saved not having to find a commuter parking space.

THE BIG MOVE

6.3 Expand GO Transit's local transit subsidy program for riders who are travelling to GO stations using local transit.

Tools & Resources

- Transport Canada: Mississauga Transit GO Shuttle Pilot Program.
- York Region Transit GO Shuttle Service Standards Located within YRT Transit Service Guidelines, May 2006.

Case Study

FIG 4.4 Mississauga GO Shuttles provide timed feeder services from neighbouring communities, reducing the need to drive to GO Train stations. Mississauga, Ontario.

PILOTING DEDICATED FEEDER TRANSIT SHUTTLES
COOKSVILLE STATION, MISSISSAUGA

- Pilot project in 2001, developed through surveys of GO Transit customers to determine routing of dedicated feeder shuttle services.
- Guaranteed a travel time of 15 to 20 minutes to GO Station, with schedules coordinated to train arrival and departure times.
- Ridership of 3,000 passengers per month on two pilot Cooksville routes, 75% of which previous drove to, or were dropped off at, GO station.
  - » Estimated reduction of 600 car trips monthly to GO Stations.
- Estimated 480 fewer park and ride trips monthly resulted from the shuttle project, or approximately 15 freed parking spaces daily.
- Service has since been made permanent by Mississauga Transit.

4.3 Implement commuter parking pricing with incentives for carpooling and alternative fuel vehicles. 2.2

Approaches

4.3.1 Phase in pricing at commuter parking lots to limit negative impacts on ridership.

- Limit expansion of 'free' commuter parking lots while introducing pricing with parking expansion and implementation of structured parking facilities.
- Priority parking spaces nearest to station entrances are an opportunity to implement parking fees while providing an obvious benefit to the customer.
- Integrate parking and transit fare payment, through the use of the PRESTO card, to improve ease of payment.
- Discourage programs that encourage 'unlimited' access to commuter parking, such as monthly rates or free parking with transit passes.
- Work with adjacent property owners to prevent spillover parking onto private lots where free parking is provided.

4.3.2 Adopt parking pricing that incentivizes carpooling and alternative fuel vehicles.

- Reduced rate or preferred parking spaces for multiple-occupant or low emissions vehicles.
- Work with local TDM and carpooling organizations to develop programs to encourage, coordinate, and enforce multiple-occupant vehicle incentives.

4.3.3 Ensure parking rates are set, at minimum, at the price of a local feeder transit fare.

Benefits

- Provides revenue to offset the capital and operating costs of commuter parking.
- Encourages alternative access modes, such as transit feeder services, cycling, and walking.
- Provides incentives for carpooling and alternative fuel vehicle use.

Applicability

- Mobility hubs where commuter parking is provided or is being considered.

FIG 4.6 The TTC introduced parking pricing at all of its subway park and ride lots in 2009, in conjunction with increased local bus service. Prices are set in context of surrounding land use and revenue is used to offset the cost of maintenance of parking lots and to fund transit operations. Toronto, Ontario.

Case Study

FIG 4.5 Parking payment machines are located close to station entrances and do not require a ticket. Calgary Transit CTrain Park and Ride Lot. Calgary, Alberta.

CALGARY TRANSIT CTRAIN PARK AND RIDE LOT CHARGING

- Phased approach to introducing park and ride charges at all of its CTrain (LRT) parking lots, operated by the Calgary Parking Authority, in response to City's goal of increasing CTrain access by transit and other modes.
- To increase customer convenience, uses the 'ParkPlus' system, which allows payment either at the machine or via text messaging from pre-loaded cell phone accounts. System does not require 'Pay and Display', rather, users enter in license plate information into machine.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

4.4 Develop a short and long term area-wide parking strategy with maximum and minimum parking standards and shared use parking practices. 2.1 2.5 4.5 5.1

Approaches

4.4.1 In conjunction with the development of mode share targets in Guideline 2.1, establish parking standards for mobility hub areas for short-term (15-year, and 25-year) Regional Transportation Plan time horizons. Approaches include:

- Parking caps for mobility hub areas that limit the total number of parking spaces allowed, which would be evaluated on a regular basis and adjusted based on performance of transportation network.
- Development of parking maximums to limit excess parking supply.
- Review and adjustment of minimum parking standards based on implementation of rapid transit.
- Remove minimum parking standards in areas with high accessibility to rapid transit stations or frequent local transit service.
- Continue to require minimum parking standards for accessible parking spaces. Provide designated accessible parking spaces within 30m of the main accessible entrance.

4.4.2 Allow for flexibility in parking provisions based on the specific land use and transportation contexts of the mobility hub.

- Develop adjustment factors that can be applied when evaluating parking supply, while ensuring parking caps and maximums are respected, with approaches such as:
  - Proximity to transit routes – allow a reduction in parking supply for developments on transit routes or within a short walking distance of nearest transit stop;
  - Availability of on-street parking – allow reduction in off-street parking requirements if on-street parking is available in proximity to development or in return for the provision of on-street parking;
  - Provision of carpool/vanpool programs – allow a reduction when a carpool program is provided in a development and dedicated spaces for multiple-occupant vehicles are provided;
  - Provision of carshare spaces – allow a reduction when dedicated space is provided for a car share program, particularly in residential developments; and
  - Provision of transit pass program – allows for providing transit passes to development users in return for reduced parking requirements.
- Encourage development to unbundle parking by requiring separate purchase or lease of parking space
- Consider cash-in-lieu contributions to fund capital expenses of public shared parking in the vicinity of development
- Allow off-site or satellite parking to meet minimum parking requirements that would create more centrally located areas of shared parking in mobility hub areas.

Benefits

- Allows for a realistic and phased parking reduction strategy based upon planned transit improvements.
- Provides certainty to developers on parking requirements and costs.
- Over long term, reduces overall parking supply to meet transportation objectives.
- Reduces overall parking supply and costs.
- Shared parking creates more efficient use of off-street parking spaces.
- On-street parking improves pedestrian environment by providing buffer from streets.

Applicability

All Mobility Hubs

- Where availability of land or capital costs makes shared parking or reduced parking requirements an attractive alternative.
- In areas where a mix of uses is existing, or proposed, to justify shared use parking.

Legend

Especially Relevant Urban Typologies

- UC1 CENTRAL TORONTO
- UC2 URBAN TRANSIT NODES
- UC3 EMERGING GROWTH CENTRES
- UC4 HISTORIC SUBURBAN TOWN CENTRES
- UC5 SUBURBAN TRANSIT NODES
- UC6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

4.4.3 Place temporary use or holding provisions in zoning bylaws to accommodate parking provision in the near-term for areas where reduced parking requirements are being phased in. Include parking phasing plans as part of development approval in these areas. PMTP 8.1

- Clearly identify benchmarks at which temporary use or holding provisions would expire:
  - When transit service levels reach an identified threshold.
  - TDM or TMA policies are implemented.
- Temporary parking uses should not be permitted in areas with high transit accessibility.

4.4.4 When new developments or significant redevelopments take place, evaluate parking to identify shared use opportunities.

- Provide opportunities to reduce parking requirements in exchange for shared use provisions, based upon parking standards identified in Approach 4.4.1.
- Encourage developers to cluster and mix uses with complementary demand peaks for parking to support shared parking, in return for reduced parking requirements.

THE BIG MOVE

7.13 Municipal parking and zoning by-laws shall be updated to:

- Establish maximum parking requirements;
- Decrease minimum parking requirements where appropriate;
- Permit off-site, on-street and shared-parking capacity to be counted towards meeting parking requirements;
- Provide priority parking for car-sharing; and
- Give landowners and developers the option of providing alternatives to free on-site parking, such as transit passes, car-sharing memberships, carpooling services, and/or financial contributions towards transit or active transportation infrastructure.

Case Study

MARKHAM CENTRE PARKING STANDARDS

Markham Centre is an emerging intensive mixed use development adjacent to GO Transit's Unionville Station and serviced by Viva rapid transit and the future 407 Transitway. The Town of Markham is taking a proactive approach to managing its parking supply in order to meet the modal split targets of the area and has adopted a parking management strategy which includes the following initiatives:

- Town of Markham will manage 35%-50% of total commercial parking supply through area parking facilities funded by cash-in-lieu payments from landowners.
- Establishment of maximum end-state parking supply targets for all uses.
- Minimum requirement for parking in structures.
- Surface parking allowed on interim basis (through temporary by-laws/holding provisions).
- Parking Implementation and Phasing Plans required as part of site plan approval.
- Enacting cash-in-lieu of parking bylaws and provisions in development process.
- Establishing urban design standards/guidelines for parking facilities and implementation of parking charges.

FIG 4.7 Mixed-use development at Markham Centre with parking standards applied including underground parking and limited surface parking, Markham, Ontario.

4.4.5 Require the development of shared parking plans when off-street shared parking is being proposed that would outline intended users, design features, and maintenance operation agreements, and includes:

- Intended users of shared use parking spaces, and the proximity to these uses;
- Signage plan to direct users to destinations;
- Pedestrian circulation plan showing connections to uses;
- Safety and security plan; and
- Parking operation and maintenance plan between shared uses.

Tools & Resources

- City of Toronto Parking and Loading Standards Review.
- Town of Oakville: North Oakville Parking Strategy.
- Markham Centre Parking Strategy – Parking Strategy for Mississauga City Centre.
- United Kingdom Department of Communities and Local Government, Planning Policy Guidance 13: Transport – Appendix D: Maximum Parking Standards.

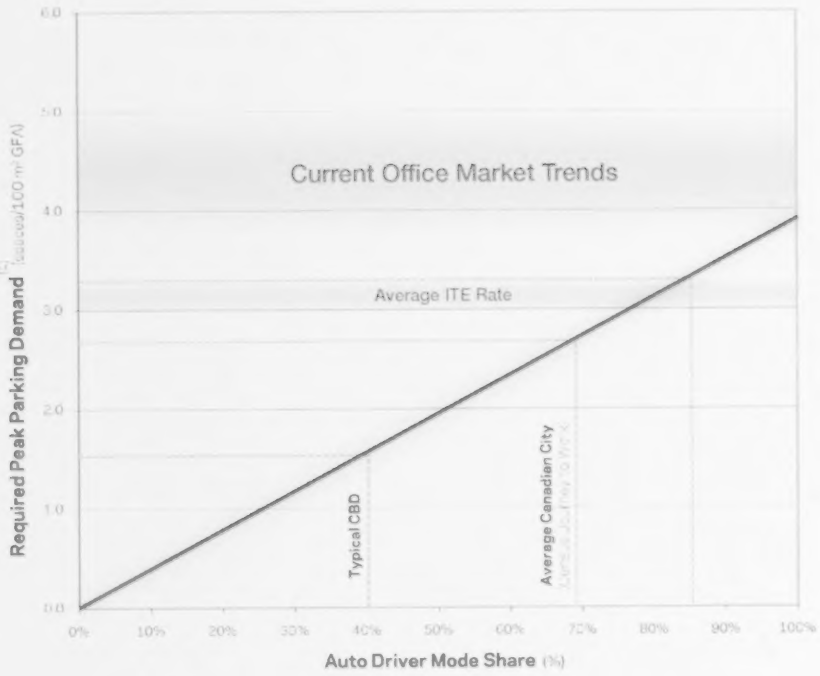
Paid vs. Free Parking
Pricing and financing should be considered to build and maintain shared parking.

Access
A common access point would reduce curb cuts and impact on sidewalks.

Directional Signage
Integrated with district wayfinding system to help users navigate.

Pedestrian System
Direct, safe and clearly marked pedestrian routes through parking facility.

FIG 4.8 Considerations for Shared Use Parking



(1) Based on 3.9 employees per 100 m^2 GFA

FIG 4.9: Peak Parking Requirements for Office Uses in Relation to Auto Driver Mode Share. This graph illustrates the relationship between auto driver mode share and required peak parking demand, per unit gross floor area. As indicated, the current office market trends provide for parking far above requirements. As mode share targets are developed, minimum parking requirements must reflect the reduced parking needs. **NOTE:** The Average ITE Rate is based on the Institute of Transportation Engineers Parking Generation Manual.

Urban Typology		Office (per 100m² GFA)	Residential		Retail/Commercial (per 100m² GFA)
			Single Unit (per unit)	Multiple Unit (per unit)	
U1	Central Toronto	0.3 - 1.75	1	0.25 - 1	0.5 - 4.0
U2	Urban Transit Nodes	0.5 - 2.25	1	0.5 - 1	1.5 - 5.0
U3	Emerging Urban Growth Centres	0.75 - 2.75	1	0.5 - 1.2	2.5 - 5.0
U4	Historic Suburban Town Centres	0.5 - 2.5	1	0.75 - 1.2	0.5 - 5.0
U5	Suburban Transit Nodes	1.5 - 3.0	1	0.75 - 1.5	3.0 - 5.0
U6	Unique Destinations	Dependent on land use and transit context.			

FIG 4.10: Suggested Maximum Parking Standards for Mobility Hub Areas by Urban Typology.

4.5 Implement parking pricing strategies as part of an overall transportation demand management program. 2.2 4.3 4.4

Approaches

4.5.1 Where parking pricing is not in place, develop a phasing strategy within area parking plans to implement priced parking in a staged manner.

- Charged on-street parking during peak hours can be an easy first step, especially in areas with high-demand for short-term parking in convenient locations.
- Charging for commuter parking can encourage adjacent developments to enact charges to discourage commuters from using free, private spaces. 4.2

4.5.2 Encourage developers to unbundle, or separate, the cost of parking from purchase or lease price of residential or commercial units.

- If not possible in office uses, require a 'cash-out' option equivalent to cost of parking that can be used for other mobility choices, such as a transit pass.

4.5.3 Apply pricing to on-street parking spaces and off-street lots.

- Lead parking rates by structuring prices of public parking to maintain an 85-90% occupancy rate. Rates that are too low will create a shortage and congestion caused by "cruising" for parking spaces. Adjust parking pricing if parking shortages occur regularly.
- Price minimum daily and short-term parking equivalent to a round-trip transit fare. Set pricing that encourages short stays, with increasing rates for longer stays.
- Clearly publicize and sign parking rates. Provide resources for adequate and consistent enforcement that deters non-payment or over-stays.
- Ensure payment system is easy to understand and use while accepting forms of payment other than cash.
- Discourage unlimited monthly parking programs and instead structure discounts based on a number of entries.

4.5.4 Localize revenue from public parking operations in mobility hubs by dedicating monies to community improvements and/or transportation demand management initiatives.

Benefits

- Reflects true cost of parking and automobile travel, providing an incentive to change travel behaviour.
- Reduces the demand for parking, leading to reduced supply needs.
- Can be used as a revenue generating tool to finance capital and operational costs of parking, or to fund community improvements.

Applicability

All Mobility Hubs

- This guideline deals with the pricing of parking other than commuter parking. Commuter parking can serve as public shared parking during off-peak hours (refer to Guideline 4.3).
- Consideration for this guideline should be taken in all mobility hub zones.

THE BIG MOVE

4.4 Encourage employers who currently offer their employees free or subsidized parking a choice between the parking or a cash equivalent that can be used for other means of transportation.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

4.6 Minimize surface parking and integrate parking within surrounding development and parking structures.

Approaches

4.6.1 Encourage development of structured or underground parking at mobility hubs.

- Provide parking spaces above minimum parking requirements in structures.
- Allow reduction in required parking supply in exchange for structured or underground parking.
- Provide incentives, such as density bonusing and waiving of development fees, for development of structured parking.
- Designate surface parking as temporary use with a regular review period for renewal.

4.6.2 Leverage existing assets in public land to 'lead by example' in developing structured parking, financed by:

- Leasing or selling of development rights above property;
- Imposing levies or charges on private parking spaces;
- Allow for contributions to constructing shared off-site structured parking in lieu of on-site parking.

Benefits

- Reduces land used for parking and increases land available for development.
- Provides for a more compact urban form with opportunities to create activity through ground floor uses.

Applicability

All Mobility Hubs

Case Study

FIG 4.11 Planned redevelopment of a surface municipal parking lot at Yonge St. and St. Clair Avenue, Toronto, Ontario.

30 ALVIN STREET (YONGE AND ST. CLAIR) – TORONTO PARKING AUTHORITY

- Toronto Parking Authority owned lands, sold land to developer following a public call for proposals.
- Development replaces all existing spaces in surface lot in proposed underground garage. TPA will continue to operate spaces as public parking and receive revenue.
- Zero visitor parking requirement, as visitors would use public parking.

4.7 Design parking facilities to a high level of architectural and landscape quality to reduce negative impacts on the environment and streetscape.

Approaches

4.7.1 Provide high-quality and safe accessible parking spaces.

- Establish minimum accessible parking design standards following best practices such as those recommended in the Tools and Resources box.
  - Establish minimum designated accessible parking spaces.
  - Define standards for accessible parking space design, including parking space dimensions, accessible aisle dimensions, signage, and maximum distance from accessible entrances.

4.7.2 Minimize visual impact of parking on the streetscape.

- Structured parking should be of high architectural quality that respects the context of surrounding uses.
- Screen surface parking from the street to maintain continuity of built form either with built structures or vegetation.
- Consider seasonal on-street parking, where space is used as expanded pedestrian space in summer, but on-street parking in the winter.

4.7.3 Parking must respect and enhance pedestrian priority and movement.

- Locate pedestrian access to parking facilities on main pedestrian corridors.
- Avoid multiple vehicular access points and where possible, refrain from locating on main pedestrian corridors.
- In surface parking lots, provide wide, visible, and direct pedestrian walkways with lighting to improve security.
- Include ground floor uses such as retail and commercial units in above ground parking structures located along major pedestrian corridors.

4.7.4 Design parking to minimize environmental impact.

- Reduce stormwater runoff and encourage infiltration of rainwater through:
  - Use of permeable materials in paving.
  - Placement of bioswales or other vegetation at boundaries of paved areas.
- Reduce urban heat island effect by:
  - Using materials with a high albedo to limit absorption of sunlight.
  - Provide shade over parking areas using trees or built structures.

Benefits

- Ensures a high quality built form and pedestrian environment.
- Minimizes environmental impact from stormwater runoff and urban heat island effect.

Applicability

- High quality design for parking facilities should be ensured throughout the mobility hub, including the secondary and tertiary zones.

Tools & Resources

- ADA Accessibility Guidelines for Buildings and Facilities (2002)
- City of Toronto Accessibility Design Guidelines (2004)
- GO Transit Design Requirements Manual (2010)

Design Precedents for Surface and Structured Parking

Reducing Visual Impact on Streetscape

FIG 4.12 Surface parking should be buffered from adjacent walkways. California Polytechnic State University, San Luis Obispo campus.

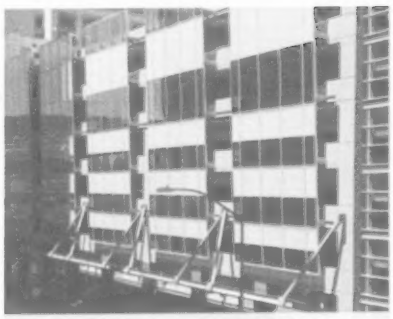


FIG 4.13 Screen lots by buildings or false building 'skins' to minimize visual impact, San Diego, CA.

FIG 4.14 Vegetation can buffer structured parking where ground floor uses are not feasible. Durham, NC.

Prioritizing and Improving Pedestrian Environment

FIG 4.15 Provide clear and protected walkways in parking lots for pedestrian access. Lacey, WA.

FIG 4.16 Create parcelled sections of parking separated by pedestrian walkways. Green Line in Portland, OR.

FIG 4.17 Encourage ground floor uses to animate pedestrian areas at structured parking lots. Reston Town Center, VA.

Reducing Impact on the Environment

FIG 4.18 Bio-swales reduce runoff from hard surfaces in parking lots. Pennsylvania State University.

FIG 4.19 Use of permeable paving reduces runoff and increases water penetration. Los Angeles State Park, CA.

FIG 4.20 Provide shade with trees over large expanses of surface parking, and in this example, solar panels are installed over parking surface. Arizona State University.

CHAPTER 07

PLACEMAKING

TRANSIT STATION
MID RISE APARTMENT UNITS IN CLOSE PROXIMITY TO THE TRANSIT STATION ABOVE RETAIL
RESIDENTIAL TOWNHOMES
URBAN PLAZA
TRANSPARENT FACADES AND MAXIMIZED FRONTAGES IN THE COMMERCIAL CENTRE

FIG 5.1 Market Common, a mixed-use urban village development in the Clarendon station area, encourages people to use transit, Arlington, Virginia.

A vibrant, mixed-use environment with higher land use intensity.

Critical to the success of the mobility hub as an efficient and attractive destination is the combination of basic employment opportunities and a mix of housing typologies supported with major retail, civic, cultural, entertainment, and community facilities. Clustering of population and employment encourages more efficient travel behaviour, reduces the need for travel, increases accessibility (e.g., proximity to employment, shops and schools), and offers travel choice (better transit, ridesharing, and better pedestrian facilities), thereby making the transportation system more efficient.

The challenge lies in determining a mix of uses based upon the nature and character of the mobility hub and establishing a developer supportive municipal framework.

THEME ONE

A DYNAMIC, VIBRANT AND COMPATIBLE MIX OF USES WITHIN WALKING DISTANCE OF TRANSIT

5.1 Provide a diverse mix of uses, including employment, housing, regional attractions and public spaces to create a high quality urban environment in close proximity to the transit station.

5.2 Focus and integrate increased and transit-supportive densities at, and around, transit stations to create a compact built form and a critical mass of activity, while ensuring appropriate transition to the surrounding community.

5.1 Provide a diverse mix of uses, including employment, housing, regional attractions and public spaces to create a high quality urban environment in close proximity to the transit station.

Approaches

5.1.1 Identify a primary development focus and a context sensitive land use mix at each mobility hub. 01 02 03 04

- Identify the unique / predominant existing land use character, if any, at each mobility hub and ensure that the long range mobility hub planning is sensitive to the local context, builds upon the existing character and land uses and is grounded on existing market demands.
- Plan mobility hubs with sensitivity to community context and character and to support existing municipal objectives.
- Conduct market analysis studies to assess the existing and future real estate market potential and understand the mix of uses that are most likely to be successful.
- Wherever feasible (based on market analysis) establish a retail 'high street' and employment centre near each station. Strategically locate convenience and/or retail close to the rapid transit station. Concentrate neighbourhood retail/employment at major intersections and incorporate residential and other community focused uses.
- Promote a variety of land uses and amenities, community facilities and regional destinations to be provided within the mobility hub.
  - » Support the provision of non-market housing units, either located within the same building or site as market housing or within the hub.
  - » Provide opportunities for the development of creative businesses by encouraging the provision of: co-working spaces, cultural amenities, live-work units, artists' lofts, and business incubator spaces.
  - » Promote public facilities, such as schools, libraries, government service centres, recreation centres, and police substations to be provided within the hub, along with residential uses.

Benefits

- Clustering of population and employment near a transit station encourages more efficient travel behaviour, reduces the need for travel, increases accessibility, and offers travel choice.
- Increased transit ridership within the system in ways that are complementary to the dominant pattern of peak-hour use, encourage bi-directional travel and reverse commutes.
- Minimizes total parking demand.
- Creates vibrant new public places.
- Promotes economic growth by attracting employment and businesses.
- Successful mixed-use developments within mobility hubs contribute to increase in land value.
- Promotes a healthier, more active lifestyle by promoting sustainable modes of travel such as walking and cycling.

FIG 5.2 Apartment units above retail space at Virginia Square station area in Arlington, Virginia.

Tools & Resources

- Smart Growth Principles
- Places to Grow Tools Ministry of Energy And Infrastructure, Ontario
- Mixed Income TOD Action Guide – Center for Transit-Oriented Development
- Transit Oriented Development Policy Guidelines – City of Calgary TOD Strategy
- Ministry of Transportation and Ministry of Municipal Affairs and Housing
- BART Transit-Oriented Development Guidelines, San Francisco Bay Area Rapid Transit District
- Urban Form Case Studies – Places to Grow Ministry of Energy and Infrastructure

Legend

Especially Relevant Urban Typologies

- 01 CENTRAL TORONTO
- 02 URBAN TRANSIT NODES
- 03 EMERGING GROWTH CENTRES
- 04 HISTORIC SUBURBAN TOWN CENTRES
- 05 SUBURBAN TRANSIT NODES
- 06 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- x1 ENTRY
- x2 TRANSFER
- x3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

- Incorporate a diversity of housing choices that includes a mixture of types, styles, price ranges and tenure to ensure a large and diverse number of residents have access to transit.
- Ensure equity and diversity within the housing stock and plan for a mix of dwelling sizes to accommodate families within the mobility hub. Amend zoning by-laws to specify a certain percentage of residential units to have more than two bedrooms. For example in the City of Toronto's Ward 20 Trinity - Spadina, the local city councillor worked with developers to voluntary include 10% "family-friendly" units (minimum of 3 bedrooms) in new condominium development.
- For employment focused mobility hubs, locate major offices in areas with existing frequent transit service and plan employment lands to have transit-supportive, compact built form with reduced surface parking.
- Design attractive and functional public gathering spaces, including parks, plazas, courtyards, and sidewalks to create the desired ambience and complement the proposed land uses within each mobility hub.
- Encourage major trip generators to be located in close proximity to the rapid transit station and connected with direct pedestrian links with feeder services.
- Adopt strategies to accommodate goods movement while minimizing negative impacts on the streetscape. For example, visually screen loading areas adjacent to streets with vegetation and decorative fencing.

Applicability

Emerging Urban Growth Centres, Historic Suburban Town Centres, Suburban Transit Nodes
There is a need for catalyst mixed-use development projects which should be developed hand-in hand with the transportation infrastructure at these hubs. Opportunities exist for mobility hubs in urban areas for continued infill development as observed in recent years with the explosion in condominium and office tower development.

Primary and Secondary Zones
Higher intensity of mixed-uses are desired in closer proximity to the transit station to reduce travel time and achieve higher sustainable mode-splits such as walking and cycling. Land uses in the Tertiary Zone should be generally planned to accommodate a range of residential types.

Case Study

OFFICE TOWERS CONNECTED BY A MAJOR PEDESTRIAN CORRIDOR OVER THE RAIL LINES TO THE INTERMODAL STATION.
MIXED-USE TOWERS WITH OFFICES & RESIDENTIAL USES INTEGRATED WITH THE INTERMODAL STATION.
CENTRAL "TRANSIT PLAZA" DIRECTLY ADJACENT TO THE STATION ENTRY LINED WITH RESTAURANTS AND SPECIALTY RETAIL.
MULTI-STOREY RESIDENTIAL ABOVE RETAIL CORNERS. INTERNAL COURTYARDS FRONTED BY GROUND-LEVEL.
Land Use | Floor Area (m²) | Floor Space %
North Lands FAR 10.03%
Offices 153,665 98%
Commercial 2774 2%
South Lands FAR 6.08%
Offices 32,050 14%
Commercial 12,705 5%
Residential 191,175 81%
Total Residential Units 2,070
Residential Density 25 U/Ha or 60 U/A

FIG 5.3 Birds eye view of Rail Town – proposed mixed-use community integrated with transit in Calgary Alberta.

UNDERTAKING MARKET STUDIES TO DETERMINE LAND USE MIXES CALGARY, ALBERTA

This 13.5 hectare Rail Town project is envisioned as a 24 hour, mixed-use development, which will become a catalyst for redevelopment in the area, attracting economic, social and cultural diversity. The land use mix encompasses a wide array of activities – office, retail, entertainment, institutional, recreational and residential-integrated with high-speed rail, LRT and heavy rail activities. The basis of determining the land use mix was a market study that provided direction based on the absorption capacity of retail, residential and commercial spaces from existing and projected market trends.

Urban Form Case Study: Prepared by the Government of Ontario specifically for Places to Grow

ESTABLISHING MIXED-USES BASED UPON THE EXISTING PREDOMINANT / UNIQUE LAND USE CHARACTER ALONG EACH STATION AREA
ARLINGTON, VIRGINIA

To ensure that new development fits in with and protects adjacent stable neighbourhoods, sector plan policies encourage:

- Improved public space and connections to the station; and
- Higher densities and taller buildings centralized around the station, transitioning to lower densities and building heights closer to existing residential communities.

Strategies for Success

- Sector plans for each station area are policy documents that envision and guide future development, they are not regulatory plans – the zoning ordinance is the regulating document. The sector plans only set goals for land use, open space, infrastructure, and urban design.
- Corridor planning process emphasized extensive public consultation and relied on community partnerships, such as the Ballston Partnership, Clarendon Alliance, and Rosslyn Renaissance.
- Comprehensive site-plan reviews were undertaken which included public meetings with staff, citizens, county commissions, and developers, as a requirement for proposed projects in the corridor to ensure they meet sector plan goals.
- The corridor's success has made housing along it so desirable that keeping housing affordable has become a significant challenge. In response, Arlington implemented an expanded density bonus provision, allowing up to 25 per cent more density to secure additional affordable housing units.

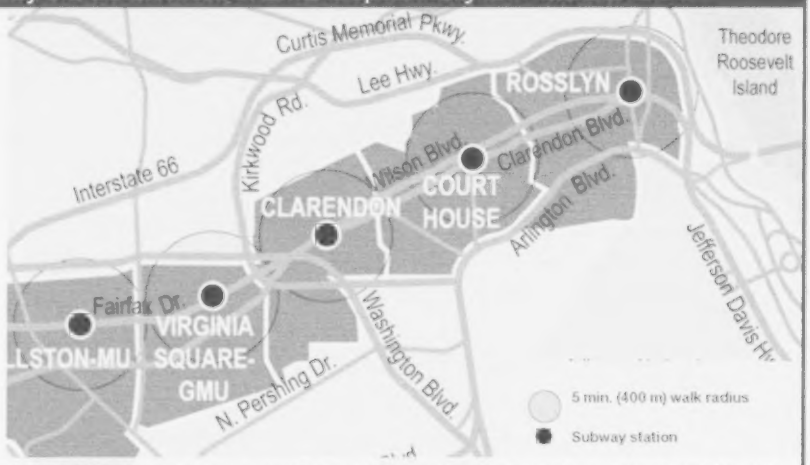


FIG 5.4 Map showing the interconnected mixed-use zones within 5 minutes walking distance from the subway stations along the Rosslyn-Ballston Metro Corridor.

Arlington County recognized the potential development benefits from a planned transit investment and decided to situate the new rail line and its fire stations beneath Wilson Boulevard and Fairfax Drive, expecting that this area would successfully support growth. Commercial development already existed along Wilson, and the County wanted to further encourage office, retail and higher development close to the stations to revitalize the adjacent neighbourhoods. The general land use plan and area specific sector plans were established, which built upon the predominant land use character existing at each station area along this corridor. The sector plans encourage walking, cycling and transit use. For example, Rosslyn station focuses on intensive office and residential uses; Court House station focuses on governmental and institutional uses; Clarendon station focuses on restaurant and retail uses; Virginia Square-GMU station focuses on educational and institutional uses; and Ballston-MU station focuses on retail commercial uses. The station areas are planned as "urban villages" and emphasize pedestrian access and safety by incorporating a variety of public amenities and connections, including neighbourhood parks, parkettes, public art, wide sidewalks with restaurant seating, bike lanes, street trees, traffic calming elements and street-level retail.

RESIDENTS & JOBS PER HECTARE	397
RATIO OF JOBS TO RESIDENTS	1:0.6
GROSS RESIDENTIAL DENSITY	70 units/ha (28 units/ac)
SITE AREA	414 ha (1023 ac)
STATION AREAS (approx. 400-1000 m radius from station entrance)	Rosslyn – 95 ha (236 ac) Court House – 80 ha (198 ac) Clarendon – 69 ha (171 ac) Virginia Square-GMU – 58 ha (143 ac) Ballston-MU – 111 ha (275 ac)
LAND USE	Residential 29,114 units Office 2 million sq.m (21.9 million sq.ft) Retail 277,452 sq.m (3 million sq.ft) Hotel 270,703 sq.m (2.9 million sq.ft)
TRANSIT	Subway with connecting regional and local bus service
PARKING	56 garages and parking lots 1,500 short- and long-term metres, 20 car sharing parking spaces

5.1.2 Plan for active uses at the pedestrian scale.

- Encourage ground-level activity and uses along main streets, key intersections, station areas and parking structures to accommodate retail and other 'active uses' with transparent facades at the ground plane to ensure high-quality pedestrian environments.
- Locate uses that generate the highest pedestrian traffic, such as retail/transit malls, within the Primary Zone and along primary pedestrian corridors. For example, specify facades that should be transparent on retail streets and zoning which regulates a percentage of active uses at grade.

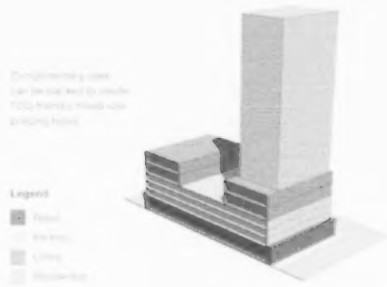


FIG 5.5 Mixed land uses can be organized horizontally or vertically but the goal of active streetscapes require active uses, such as retail, to be located at ground level.

5.1.3 Utilize planning tools to obtain desired land-uses within mobility hubs. 9.1 9.3

- Amend Municipal Zoning By-Laws to designate the Primary and Secondary zones as "mixed-use zoning" to promote a mix of complementary and transit-supportive residential, employment and retail uses, especially within the Primary and Secondary Zones. For example, the City of Toronto suggests exempting ground floor retail from GFA, development charges, parking requirements and property tax to promote retail and live-work mixed-uses.
- Exercise the new powers given to municipalities under Bill 51 of the Planning Act to update the current Zoning By-Law to include transit supportive provisions such as establishing minimum densities, requiring active ground floor uses within mobility hubs, regulating the percentage of active ground floor uses within the station area and encouraging the orientation of buildings towards public streets.

Case Study

FIG 5.6 Ethiad Stadium Sporting Arena is located in close proximity to the Southern Cross Rail Station in Melbourne Australia.

PLANNING FOR ANCHORS / TRIP GENERATORS IN CLOSE PROXIMITY TO THE TRANSIT STATION
MELBOURNE, AUSTRALIA

Southern Cross is a major railway station and transport hub in Melbourne, Victoria, Australia. It is located at the western edge of the central business district. The Ethiad Stadium sporting arena is 500 metres south-west of the station and is a regional attraction contributing significantly to the ridership. The central features of the design include a wave-shaped roof, a new entrance and concourse, a new bus interchange, a new food court, a bar/ restaurant, separate retail outlets inside the station and a separate shopping complex in between. Southern Cross Station also has a coach terminal under the shopping complex, connecting other regional destinations and important trip generators such as the Melbourne Airport.

5.2 Focus and integrate increased and transit-supportive densities at, and around, transit stations to create a compact built form and a critical mass of activity, while ensuring appropriate transition to the surrounding community.

Approaches

5.2.1 Plan for a hierarchy of densities within the hub with a smooth transition between the hub and the surrounding community. U1 U2 U3 U4

- Where possible, locate the highest densities (residents and jobs combined / hectare) in closest proximity to the transit station, decreasing towards the edge of the hub around / along the surrounding communities.
- Provide a transition between the mobility hub and the surrounding area by stepping down the height of structures, reducing lot coverage, increasing open space, increasing architectural detailing, reducing permitted maximum densities, changes in use, or a combination of these methods.
- Employ a variety of building massing strategies to accommodate higher densities and building intensities in order to avoid monolithic building masses.
- Use high-rise towers judiciously to reinforce landmark locations and to punctuate the skyline. Mid-rise building forms are a practical alternative to achieve high densities.

Benefits

- Increased transit-supportive densities within close proximity of the transit station enables convenient and comfortable pedestrian trips, potentially increasing the number of transit users.
- Ensures efficient use of land encouraging intensification and compact built form and discouraging dispersed suburban development.
- Supports higher levels of transit service thereby promoting efficient and cost-effective urban transit ridership.

FIG 5.7 Portico, a high-density, mixed use development of different building types, ranging from four-storey townhouses to five-storey mid-rise blocks and eleven, fifteen and twenty-storey towers. This array creates an effective transition in built form to the surrounding context. Portico, Vancouver.

Some mobility hubs located in or near urban growth centres should ideally exceed the legislated minimum densities as per the Growth Plan. Densities in other mobility hubs should be comparable to the legislated minimums and help attain the municipal intensification targets to provide a base for a variety of housing, employment, local services and amenities that promote transit usage, encourage pedestrian activity and support a vibrant station area community.

The planned development and densities should be concentrated in the primary and secondary zone to ensure that it is transit supportive while within the Tertiary Zone should be compatible with both the established character of the surrounding neighbourhoods for seamless integration and transition to the community.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

5.2.2 Encourage infill and redevelopment to achieve higher densities and a greater mix of uses.

- Define the appropriate variety of housing types based on existing and desired development patterns within the context of adjoining neighbourhoods.
- Locate buildings near the plot edge to allow for future infill development.
- Buildings should be grouped together to allow for easy pedestrian access and to frame public spaces.

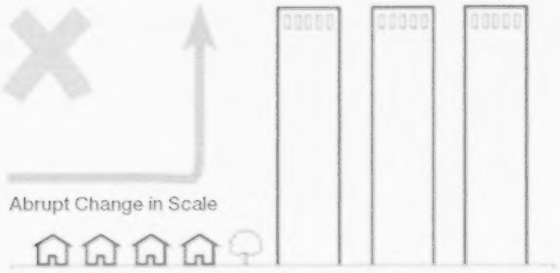


FIG 5.8 Plan for a smooth transition between built form.

Applicability

All Mobility Hubs
All Zones of Influence

Mobility hubs and other station areas are to be planned to achieve increased residential and employment densities that support and ensure the viability of existing and planned transit service levels. Strategies to accommodate population and employment growth, by focusing intensification in the Primary and Secondary Zones, are critical in achieving higher densities in mobility hubs than surrounding areas and an appropriate transition of built form to adjacent areas. In addition, density targets within mobility hubs should ideally exceed the policies in the Growth Plan pertaining to urban growth centres.

5.2.3 Use and amend existing planning tools to exceed the legislated minimum densities in the Growth Plan where applicable and meet the intensification targets. 2.2

- Amend zoning by-laws to permit reduced minimum lot sizes and/or frontages, and/or higher floor space indexes in residential and non-residential areas in order to encourage higher densities.
- Enact minimum density and minimum heights in mobility hubs to ensure that development intensities in the Primary and Secondary Zones are transit supportive in the early phases of development.
- Discourage low-intensity, land-consumptive uses related to light or heavy industry such as outdoor storage or construction staging.
- Establish density targets in the mobility hubs while providing flexibility to adapt to changing market conditions and encourage a variety of development intensities and heights.

Tools & Resources

- **Form-Based Codes**
- **SmartCode V9.2 ©DPZ & Co.**
- **Transit Oriented Development Design Guidelines Framework – Florida Department of Transport**

Urban Form Case Study: Prepared by the Government of Ontario specifically for Places to Grow

DEVELOPING A HIGH-DENSITY CORE AROUND A GO STATION WITH A MIX OF LAND USE ALONG A MAIN STREET MISSISSAUGA, ONTARIO

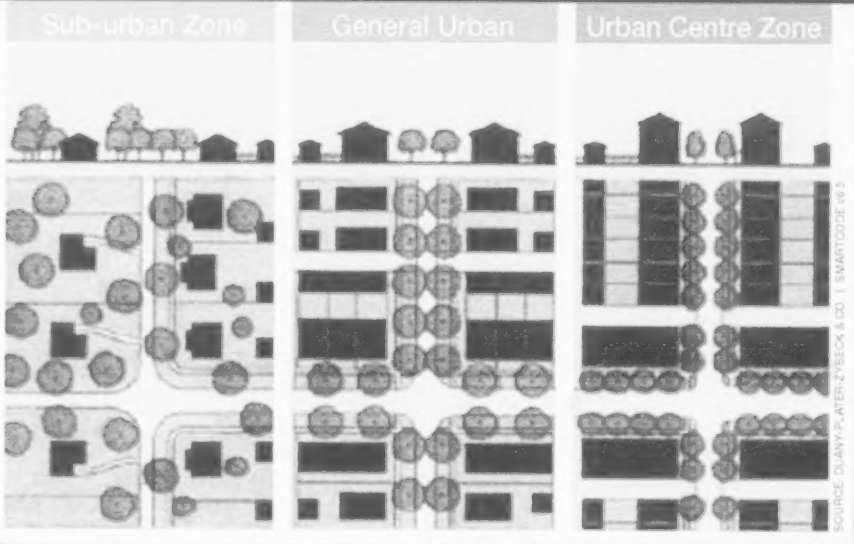
Port Credit Village Phase 1 (the Village) is a brownfield redevelopment that enhances an established main street. The new development is within walking distance of the Port Credit GO Station and features compact, pedestrian-oriented, mixed-use development. The Village has higher densities than the surrounding neighbourhoods, accommodated in a pedestrian-oriented neighbourhood structure. The neighbourhoods surrounding the Village are part of an older urban street grid system and have been the focus of intensification for the City of Mississauga since the 1950s. The Village is bordered to the east by single, detached, low-rise housing and to the west by high-rise rental and condominium apartment buildings. To blend into the existing neighbourhood, the Village's buildings gradually transition in height from three-storey townhouses in the east to six-storey, mid-rise apartment buildings in the west.

RESIDENTS AND JOBS PER HECTARE	119
RATIO OF JOBS TO RESIDENTS	1:6
GROSS RESIDENTIAL DENSITY	39 units/ha (16 units/ac)
SITE AREA	10.5 ha (26 ac)
LAND USE	**Residential:** 225 condominium apartments 167 condominium townhouses 18 condominium live/work units **Retail:** 3,700 sq.m (40,000 sq.ft) **Office:** 1,400 sq.m (15,000 sq.ft)
MAXIMUM HEIGHT	6 storeys, average of 3 storeys
TRANSIT	Commuter rail and local bus service
PARKING	70 commercial spaces 3+ spaces/townhouse 596 underground condominium

FIG 5.9 High-density development and a mix of uses in the core of the Port Credit development.

FIG 5.10 High-density three storey town-home development to blend into the existing fabric of the surrounding community.

Case Study



These illustrative scenarios represent possible land uses and are not meant to indicate building mass or design. All numbers indicate general figures regarding job creation, retail, commercial and residential units for the area. Not every building would support these numbers.

ILLUSTRATIVE LAND USE MODELS			T3	T4	T5
	MIXED USE COMMERCIAL				
	OFFICES	20%	–	PER BUILDING APPX. 3-4 FLOORS APPX. 45 JOBS/POPULATION	PER BUILDING APPX. 5-8 FLOORS APPX. 90 JOBS/POPULATION
	COMMERCIAL	20%			
	RETAIL	15%			
	HOUSING	45%			
	MIXED USE RESIDENTIAL				
	RESIDENTIAL	45%	–	PER BUILDING APPX. 1-3 FLOORS 20 JOBS 20 RESIDENTIAL UNITS 30 RESIDENTIAL POP.	PER BUILDING APPX. 4-6 FLOORS 35 JOBS 25 RESIDENTIAL UNITS 63 RESIDENTIAL POP.
	LIVE WORK	20%			
	OFFICES	35%			
	EMPLOYMENT	100%	PER BUILDING APPX. 1-2 FLOORS APPX. 100 JOBS/POPULATION	PER BUILDING APPX. 3-4 FLOORS APPX. 200 JOBS/POPULATION	–
	RESIDENTIAL	100%	PER BUILDING APPX. 1-3 FLOORS 1-6 UNITS APPX. 3-18 POPULATION	PER BUILDING APPX. 4-6 FLOORS 45 UNITS 105 POPULATION	–

FIG 5.11 Illustrative Land Use Models & Densities Region of Waterloo, Station Area Plan.

ILLUSTRATIVE LAND USE USING BUILDING MODELS TO GENERATE LAND USE MIX AND SMARTCODE TO GENERATE DENSITIES

WATERLOO, ONTARIO

To assist with station area planning, illustrative building models were established to generate a mix of land uses within each zone based on the land use preferences and density targets (already established in the Region of Waterloo's Growth Framework as per station area contexts and typologies). Zones T3 – T5 (SmartCode V6.0 ©DPZ & Co.) were chosen as the focus of planning specific to the Region of Waterloo. Each zone differs in regards to built form, land uses and density (no. of jobs and population per hectare). Some station areas were to be planned with an employment focus vs residential focus while others were to be planned as mixed-use communities. A mix of these building typologies will be used to create the station area planning framework depending on the typology of the station area and the target density.

PLACEMAKING

A vibrant mixed-use environment.

5

FIG 6.1: King St., Kitchener, ON: Paving materials help to define the amenity zone on Kitchener's King Street, which includes a coordinated program of benches, decorative planting pots, bicycle racks, light posts, and garbage receptacles.

An attractive public realm.

Although each mobility hub will have a unique set of characteristics, it is important that they all promote a well-defined sense of place and provide comfortable, safe, and attractive streets and public spaces. Whether in a mixed use commercial or residential area, a safe, interesting, and engaging public realm encourages walking or cycling and makes the transit system more attractive to potential users. Providing visual interest at the pedestrian scale through thoughtful landscaping and building design will encourage people to use the public realm and help contribute to an active street life.

Placemaking within a mobility hub should build upon a neighbourhood's unique character through context-sensitive architecture and landscaping, while supporting convenient, direct and enjoyable pedestrian linkages to and from all transit stations.

THEME ONE
A STRONG SENSE OF PLACE

6.1 Create an attractive and comfortable public realm with a strong sense of place in order to support a walkable station area and promote the use of transit.

6.1 Create an attractive and comfortable public realm with a strong sense of place in order to support a walkable station area and promote the use of transit.

Streets, sidewalks, and buildings are the physical infrastructure of placemaking and the quality of their design can directly affect the liveliness of a mobility hub area. In a mobility hub, streets and sidewalks are interconnected and different transportation modes (walking, cycling, transit) are encouraged. A mobility hub plan needs to accommodate a balance between these different modes and ensure the safety of pedestrians and cyclists.

In addition to high-quality streetscapes, a mobility hub should plan for parks, courtyards, forecourts and open space. A diversity of public places, including open spaces and civic uses, encourages social interaction and community participation. These spaces should be highly visible, convenient and accessible along pedestrian corridors in a mobility hub.

FIG 6.2 Manhattan, New York: Pedestrians and cyclists are prioritized on this Manhattan street where the lanes have been narrowed to accommodate a bike lane and public space. Landscaping features provide a comfortable buffer between pedestrians and vehicles and adds visual interest to the street.

FIG 6.3 King Street, Kitchener, ON: Streetscape details such as planting beds and vegetation, pavement material, continuous street trees, and coordinated signage for local events, contribute to the character of King Street and foster community pride.

Benefits

- Creating a high-quality public realm and pleasurable pedestrian experience encourages people to:
  - Walk to the transit station rather than use their automobile.
  - Shop and stroll along the mobility hub main street during both peak and off-peak travel times.
- Creates an energized and active streetfront that supports local retail and community pride.
- Promotes a healthier, more active lifestyle by creating a pleasurable walking and cycling experience.
- Helps to support a walkable station area and promote the use of transit.
- Trees and vegetation help to reduce the urban heat island effect and decrease energy costs related to air temperatures.
- Streetscape landscaping can provide traffic calming benefits and increased safety for pedestrians.
- Trees and landscaping add interest, ornamentation and continuity between urban spaces, while contributing to a reduction of noise and air pollution.
- Providing a comfortable pedestrian trip potentially increases the number of transit users.

Applicability

All Mobility Hubs

- While pedestrian amenities are particularly important in close proximity to the station, an attractive pedestrian environment should be provided throughout the different mobility hub zones.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

Approaches

6.1.1 Provide a high quality and aesthetically pleasing public realm. 23 24

The public realm accommodates a diversity of activities and the design of the sidewalk and its edges are important to the creation of a successful pedestrian realm.

The provision of high quality public sidewalks on all streets will help contribute to the liveliness of the mobility hub area as they are important spaces for social interaction. On key pedestrian corridors, the sidewalk design should prioritize the pedestrian by providing an attractive, interesting and comfortable walking experience, while accommodating a balance between movement and amenities.

- Special paving and materials, such as coloured concrete, 'stamped' concrete, coloured pavers, paving blocks or coloured and stamped asphalt should be used to identify high pedestrian traffic zones or community elements such as commercial areas, schools and parks. The choice of paving material and design should minimize uneven surfaces to ensure pedestrian comfort, safety and ease especially for people with physical disabilities.
- Accent lines/edges of materials and/or colors should be used to define the edge of the sidewalk.
- Sidewalk width should relate to its function (i.e. main retail street vs. residential) and be designed to accommodate the anticipated amount of pedestrian traffic.
- Design or maintain clear view corridors along sidewalks connecting to the transit station and important civic buildings and landmarks.
- Coordinate paving materials and paving patterns with that of the adjoining public right-of-way.
- Minimize physical barriers for accessing buildings as much as possible to facilitate accessibility.
- Minimize private driveway crossings over pedestrian circulation routes wherever possible. Locate them off of rear laneways or side streets whenever feasible.

FIG 6.4 Port Credit, Mississauga: Frequent entrances and windows on this retail street in Port Credit contribute to a comfortable pedestrian experience.

FIG 6.5 Arbutus Village: A tree lined sidewalk and glass awning provide shelter for pedestrians on this mixed use street.

FIG 6.6 Port Credit, Mississauga: The sidewalk width on this residential street is proportional to a lower level of pedestrian activity.

FIG 6.7 King Street, Kitchener: The sidewalk width on this residential street is proportional to its high level of pedestrian activity & mixed-uses.

6.1.2 Provide trees and street furniture to dramatically improve the quality of the pedestrian experience and enhance safety by providing a physical and visible buffer between the pedestrian and the car, and encourage slower traffic speeds. Z1

Trees and street furniture dramatically improve the quality of the pedestrian experience and enhance safety by providing a physical and visible buffer between the pedestrian and the car and encouraging slower traffic speeds (visual friction).

- Create a well-defined street and a sense of enclosure with a tree canopy and landscaping.
- Incorporate stormwater management techniques into streetscape design elements, such as landscaped medians, sidewalk planters and pervious paving.
- Protect and preserve existing street trees.
- Use plant species, native and non-native, that are hardy and drought and salt resistant.
- Consolidate soft landscape areas to enhance tree and plant growing conditions.
- Expand rooting zones of landscaped areas under adjacent hard paving surfaces. Techniques may include the use of structural soils or cells, continuous planting trenches and/or permeable paving.
- Consider the use of bio-swales where appropriate.
- Place street trees at uniform intervals in the buffer zone of the sidewalk.
- Street furniture, such as benches, bike racks, wastebins, artwork, signage and information kiosks should be placed in the buffer zone of the sidewalk.
- Locate signage along primary pedestrian routes scaled and located for the pedestrian.
- Where possible, street trees and furniture should provide weather protection along primary pedestrian routes.

FIG 6.8 King Street, Kitchener: Continuous planting bed adds greenery to the streetscape and manages stormwater runoff.

FIG 6.9 Yonge St., North York, Toronto: A continuous planting bed and row of trees provides vegetation on a wide street.

FIG 6.10 King St., Kitchener, Ontario.

6.1.3 Provide for and allocate minimum open space requirements.

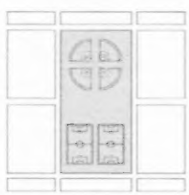
- Open areas such as amenity spaces, green spaces, playgrounds, parks and natural areas, plazas and civic squares etc. should be located throughout the mobility hub so that the majority of residents are within a five minute walking radius from active and passive recreation uses. For example, the City of Ottawa's Official Plan target for total public greens pace is 4 ha per 1,000 population. The Planning Act permits acquisition of parkland at 1.0 ha for every 300 dwelling units (and 2% of land area for commercial and industrial uses). The Ottawa Parkland Dedication By-Law caps parkland dedication for apartments at 10% of the associated land area.
- Design open spaces to reflect the identity or character of the local neighbourhood.
- In open spaces, incorporate weather protection elements such as shading for summer days, and wind breaks and solar access for winter days.
- Visibility between open spaces, sidewalks and the street should be maintained to ensure safety, visibility and connectivity between the different elements of the public realm.
- Public access to parks and open spaces should be clear and legible. Fencing can deter people from entering parks and squares, and therefore should be avoided wherever possible. Other strategies include coordinating hardscape treatments between the park and the sidewalk.
- Where possible, open spaces should incorporate natural features where they exist, such as rivers and creeks or other sensitive environmental features.

Case Study

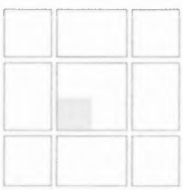
TRANSIT ORIENTED DEVELOPMENT GUIDELINES CITY OF CALGARY, ALBERTA

Green
Medium-sized public spaces intended for unstructured recreation. Should be framed by some combination of landscape features and buildings featuring grassy areas and trees. Ideal for locations along primary pedestrian corridors.

Playgrounds
Small open areas designed and equipped for children to play. Should be small and interspersed throughout primarily residential areas.



Parks & Nature
Large open areas available for civic purposes, informal recreation, play or enjoyment of nature. Should be mostly natural but can include structures or other man-made features. Should be located at a neighbourhood edge and fronted by buildings or major natural features.



Plaza
Public spaces at the intersections of important streets used for civic purposes, outdoor seating and social interaction. Should be highly visible and framed by buildings and streets. Surfaces should be durable with trees or other weather protection elements.

Amenity
Indoor or outdoor space designed and equipped for active recreation. Should be integrated with the new mixed-use development and spread equitably throughout TOD neighbourhoods.

Trails
Connected greenways for pedestrian and cyclist use. Should be located to provide connections to destinations outside the TOD. Should be a combination of natural landscaping and pathways suitable for walking and cycling.

Civic Squares or Commons
Medium-sized urban spaces available for informal recreation and play and outdoor/nature appreciation and education. Should be located at the intersection of important pedestrian and vehicular connections. Major civic buildings should front these spaces.

FIG 6.11 Open Space Typologies, TOD Guidelines, City of Calgary, Alberta

6.1.4 Create a variety of visually appealing building masses within each mobility hub.

- Building mass and height should minimize negative environmental effects, such as overshadowing of public spaces.
- The form of 'buildings as a group' should take precedence over the form of single buildings by virtue of considering the overall composition of the group.
- Towers should be compatible both with existing and proposed neighbouring structures and in terms of their contribution to the skyline.
- On sites adjacent to existing, lower-scale buildings, new developments should utilize intermediate-sized structures and landscaping to create a reasonable visual transition from existing to new development.
- Developments exceeding 10 storeys should have tall, slender towers, rather than bulkier, squat buildings.
- The relationship of building size to the site area and configuration should be considered in order to avoid a building overwhelming its site. In such cases, lower densities should be used.
- Limit the building setback from the road right of way. Locating buildings close to the street will help to create a sense of enclosure and comfort for pedestrians.
- An appropriate street wall height will help maintain a human scale at the sidewalk, ensuring adequate sunlight, sky view and ventilation.
- Ensure height to width ratios that create a scale on thoroughfares that is comfortable to people and encourages walking (human scale).

Case Study

CREATING A VARIETY OF VISUALLY APPEALING BUILDING MASS WITHIN MOBILITY HUB
TRANSIT ORIENTED DEVELOPMENT GUIDELINES, CITY OF CALGARY, ALBERTA

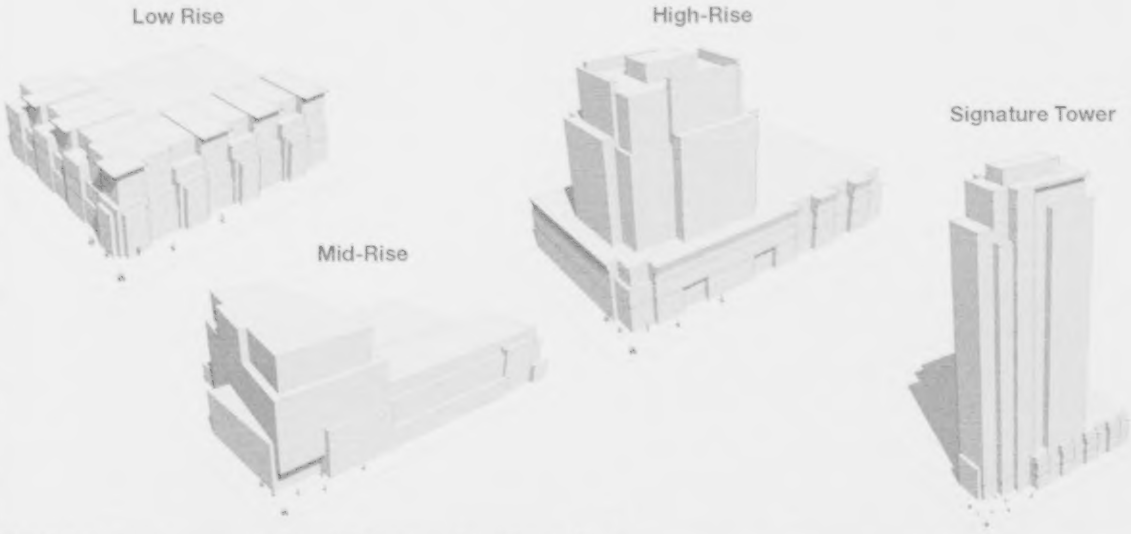


FIG 6.12 Built form and massing strategies, TOD Guidelines, City of Calgary, Alberta

6.1.5 Provide high quality building exteriors and materials reflective of an urban setting.

- Building scale should be modulated, and broken down through the judicious use of stepping, projections, canopies, trellises, changes in scale, fenestration patterns, materials and finishes.
- Important civic or corporate buildings or buildings at the termination of a vista, should be planned to be employed as a focal feature / features to contribute to the urban design of the community. These could take the form, for instance, of an architectural element on the building or a significant piece of artwork in a plaza.
- Buildings should be oriented towards the pedestrian, with active uses located along the sidewalk and not located behind parking lots or blank walls.
- Align buildings with the sidewalk and design uses facing the street rather than parking lots.
- Corner lot buildings or flankage lots should be oriented toward the street with their building elevations treated as principle building facades.
- Locate buildings along street frontages, enclosing the street block while maximizing courtyard space within the block.
- The main entry of each new building should face a public space such as streets, park, or plaza, rather than a parking lot.
- The private space that extends from the building face to the public right-of-way must be designed in such a way that it seamlessly blends with the design of the public realm.
- Paving material, pattern, and texture, including site elements such as seating and lighting, should match that of the public right-of-way in order to blur the line between the public and private realm.

FIG 6.13 Active uses at street frontage encourage uses and connections to publicly accessible open space at Pearl Street mall, Boulder Colorado.

FIG 6.14 Grand Place, Montreal: Comfortable seating area overlooked by storefront windows contribute to a vibrant plaza at night.

FIG 6.15 Live-Work Units along main street, Lakeshore Road East, Port Credit Village, Mississauga.

FIG 6.16 Transparent facades at street level create a more active pedestrian environment.

FIG 6.17 Bay Street, Toronto: Landscaping defines the space in this building forecourt, providing a welcoming transition between the sidewalk and building entrance.

6.1.6 Incorporating Crime Prevention Through Environmental Design (CPTED) techniques should be considered in the design of pedestrian corridors at all stages of mobility hub development to optimize natural surveillance.

- Provide a clear boundary of controlled space.
  - » Defining clear boundaries declares ownership of space and increases recognition of public versus private space. The declared space may then be more easily defended.
- Provide clearly marked transitional zones.
  - » Transitional zones are a form of boundary definition and access control. It should be clear and visible when someone is crossing the boundary into controlled space, thereby clarifying ownership and reducing the potential for improper behavior.
- Gathering areas should be located where good natural surveillance and access control enable such areas to be more active and likely to support positive activity.
- Locate vulnerable activities, such as waiting at night, in safe locations with good natural surveillance and street-level activity, such as along mixed-use streets or retail plazas. The controlled atmosphere creates a perception of risk for potential offenders and provides security to those using public space for legitimate uses.
- Design the environment to optimize natural surveillance. Design strategies include: adequate site lighting; mixed-use development with retail at-grade and residential or office development above; avoiding blank walls; and low level fencing or vegetation that allows visual surveillance of semi-private areas and parking lots.

Large windows at upper levels promote casual supervision of street.
Clear building signage.
Exterior of building well illuminated.
Large windows at-grade promote surveillance from street.
Clearly defined private and public space.
Good pedestrian-scaled lighting on street.

FIG 6.18 Application of CPTED principles along main streets and TOD centres

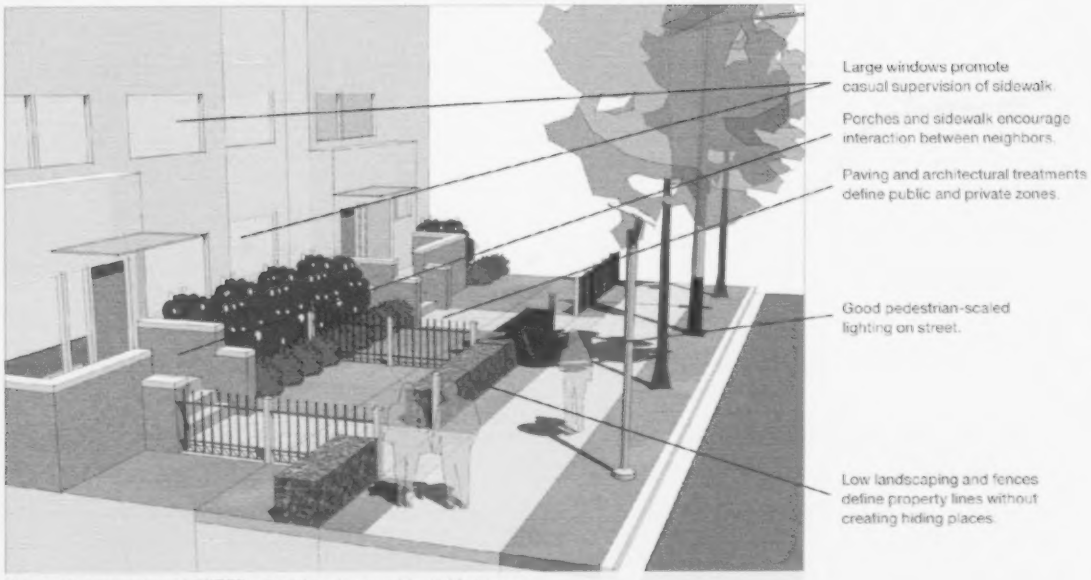

Large windows promote casual supervision of sidewalk.
Porches and sidewalk encourage interaction between neighbors.
Paving and architectural treatments define public and private zones.
Good pedestrian-scaled lighting on street.
Low landscaping and fences define property lines without creating hiding places.

FIG 6.19 Application of CPTED principles along residential frontages.

6.1.7 Plan for weather protection in extreme climates.

- Maximize sun exposure for waiting areas (especially in winter months) by the careful location of seating, plantings and building elements. Building heights and massing should also be designed to limit shadowing of parks and other major public spaces.
- Provide shade in summer; and provide protection from wind, rain and snow with plant screens, walls and canopies.
- Avoid wind tunnels and large barren expanses in the design of the station and surrounding area.
- Pedestrian connections and waiting areas should incorporate durable paving that is resistant to salt and snowplow damage.
- Weather protection should be incorporated into streetscape design. This can be achieved with the use of canopies, shelters and street trees.
- Emphasize the use of colour, light, street furniture and natural materials to counter dreary effects of winter days and nights.
- Incorporate coniferous trees into landscape design to provide natural colour in winter and valuable wind screen.
- Design and position buildings to minimize wind tunnelling and the creation of uncomfortable microclimates.

6.1.8 Create opportunities in the public realm for the implementation of public art.

- Locate art in proximity to the active transportation network, other areas of high pedestrian activity, transit stops, public open spaces, and areas of special heritage or community significance.

FIG 6.20 Nathan Phillips Square, Toronto.

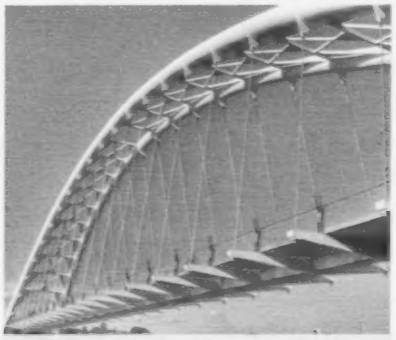


FIG 6.21 Humber River pedestrian bridge, Toronto.

FIG 6.22 Street furniture as public art in Mexico City.

FIG 7.1 Parking structure with green roof in Miami, designed by Arquitectonica.

A minimized ecological footprint.

Mobility hubs should be planned to become examples of well integrated land use and transportation policies with environmentally sustainable design. Improved transit service, and the concentration of people and jobs around transit nodes has the potential to significantly reduce transportation energy use and emissions. Building on these benefits, there is the opportunity to make mobility hubs best practice examples of environmental sustainability, both in terms of design and operation of facilities.

Strategies for minimizing the mobility hub's environmental footprint should consider how to reduce its impact on the urban heat island effect, energy efficiency, waste management, and storm water run-off management, as well as preserving and enhancing the natural environment and built heritage.

THEME ONE
MINIMIZED ECOLOGICAL FOOTPRINT

7.1 Prioritize and implement innovative sustainable energy, water, landscape and waste management practices.

7.1 Prioritize and implement innovative sustainable energy, water, landscape and waste management practices.

Approaches

7.1.1 Design and retrofit transit facilities and public buildings to maximize energy conservation. All new and retrofitted transit facilities and public buildings within mobility hubs should be designed to achieve LEED Gold status. 3.1

7.1.2 Encourage development to meet high standards of energy conservation through existing green building standards, such as LEED.

Energy conservation and generation in mobility hubs should consider the following approaches:

District Energy

- Use district energy systems powered by geothermal, solar and other renewable sources of energy.
- Ensure that the placement and number of facilities provide maximum efficiency and minimize losses in energy distribution.

Solar Capture

- Design 'solar ready' buildings including adaptable roof surfaces and an effective building orientation after assessing solar suitability on site.
- Implement solar powered lighting and LED lighting to minimize energy consumption.

Wind Energy

- Assess wind energy generation suitability on site. Explore the use of micro turbines in addition to large scale facilities.

Building Design

- Provide high-performance building envelope systems.
- Consider energy efficiency certification processes for new construction.
- Set a minimum energy performance target.
- Ensure buildings include operable and controllable systems for user comfort and maximum resource efficiency.

Landscape Design

- Implement full cut-off lanterns to minimize light pollution, glare and light trespass to ensure protection of the night sky.

Benefits

- Conserves resources and reduces landfill waste.
- Reduces energy consumption.
- Reduces the urban heat island effect.

FIG 7.2 A green roof was installed on Eglinton West Station's roof in Toronto during the station's planned repair program.

FIG 7.3 LED lights in a bus shelter in Portland, Oregon run by batteries and re-charged by solar panels.

Legend

Especially Relevant Urban Typologies

- 01 CENTRAL TORONTO
- 02 URBAN TRANSIT NODES
- 03 EMERGING GROWTH CENTRES
- 04 HISTORIC SUBURBAN TOWN CENTRES
- 05 SUBURBAN TRANSIT NODES
- 06 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

7.1.3 Adopt measures in water management to minimize water consumption and the impact of runoff and wastewater of transit facilities, public buildings, and development.

Domestic Water Consumption

- Use potable water only where required, primarily for hand-washing. Flush fixtures and irrigation can use treated water, including effluent from treatment facilities located within buildings. Select low flow water fixtures to reduce water consumption.

Irrigation

- Select a native, drought tolerate, resilient plant palette and use municipal treated sewage effluent, which requires minimal processing, where possible.

Wastewater

- Explore anaerobic digestion, a net zero carbon process eliminating energy use impacts of traditional water treatment.

Stormwater

- Manage rainwater and snowmelt on-site with designs that encourage infiltration, evapotranspiration and water reuse such as bio-retention areas and bioswales to reduce the amount of storm water run-off and subsequent pressure on municipal systems.
- Landscape for rainwater collection and absorption, emphasizing permeable surfaces, green roofs and rainwater cisterns.
- Set stormwater retention standards to limit runoff in relation to total average annual rainfall depth.
- Set standards for water quality of stormwater run-off to minimize suspended solids and chemicals.
- Naturalize stormwater management systems with plant species to encourage natural habitat preservation and survivability.

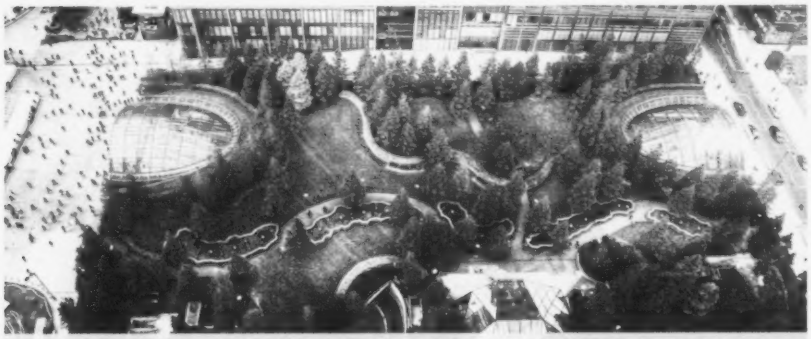


FIG 7.4 At London's Canary Wharf Station, the green roof above the station concourse became 'Jubilee Park', creating a major green and public space in the district.

THE BIG MOVE

7.15 At minimum, master plans will: ...include design policies that help achieve environmental sustainability objectives, such as LEED Gold or equivalent standards, for any new transit-related buildings.

Applicability

All Mobility Hubs

- Pursue sustainable approaches in all zones of the mobility hub.

Tools & Resources

- **Building Design Rating Systems** (e.g. LEED Certification – LEED for New Building / Retrofits & LEED ND, ENERGY STAR).
- **Sustainability targets, standards and checklists** (e.g. Toronto Green Standard, life cycle costing analysis).
- **Fast-track development applications** that meet sustainability targets.
- **Incentive & rebate programs** (e.g. City of Toronto's Industrial / Commercial / Institutional Water Efficiency Programs: Capacity Buyback Program, Industrial Water Rate Initiative, Sewer Surcharge Rebate Program).
- **Toronto Green Standard**
- **MAX Green Line Sustainable Practices, June 2009 TriMet, Portland Oregon**
- **Canada Green Building Council**
- **City of Toronto's Water Efficiency Programs**
- **BC Climate Action Toolkit**

FIG 7.5 Green roof on GO Transit's Streetsville Bus Facility provides energy efficiency, filters and cleans stormwater, and adds to the overall biodiversity of the site.

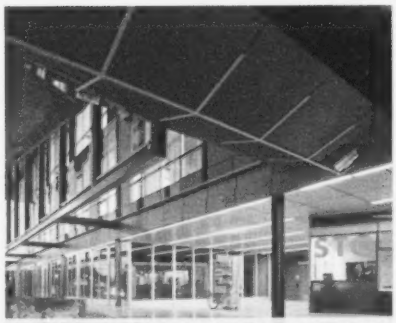


FIG 7.6 Tempe Transportation Centre achieved LEED Platinum and reduced energy consumption by 52%, compared to a conventional design.

FIG 7.7 Union Station's train shed will be refurbished with a green roof and large glass atrium to let in natural lighting.

7.1.4 Ensure that landscape and building design maximize tree cover, reduce hard surfaces, and minimize heat retention and the urban heat island effect.

- Set tree cover standards to encourage tree growth, including root cell systems that minimize soil compaction, especially in station areas.
- Use native and drought-resistant species to minimize the need for irrigation.
- Minimize the extent of impermeable surfaces by utilizing permeable pavers and soft landscaped areas.
- Reduce the urban heat island effect by minimizing the extent of paved surfaces and encouraging the use of light coloured materials, particularly on roof surfaces.
- In addition to reducing stormwater retention, green roofs can increase building heating and cooling efficiency, reduce energy consumption, and provide green space.
- Use local stones and hardscaping materials to minimize ecological footprint.
- Set water efficiency standards for landscaping and reduce potable water consumption by using recycled water systems for irrigation and high efficiency irrigation technology (e.g. rainwater harvesting, gray water reclamation, drip line systems).

FIG 7.8 Bioswale filters stormwater runoff at the GO Bus Transit Facility, Streetsville, ON.

7.1.5 Adopt waste management strategies that reduce the output of waste to landfills and increase recycling and the reuse of materials.

Recyclable solid waste

- Design for at-source sorting and provide an on-site facility, as needed, to facilitate the reduction of waste to be disposed at the municipal landfill.

Separation of organic waste

- Separation of food and landscape wastes can be taken to the on-site composting plant.

Compost to energy

- Composting of organic waste can be converted into cooking fuel or compressed for use in vehicles.

Construction waste

- Divert demolition and construction waste from landfills and encourage recycling of building materials.

FIG 7.9 Native grasses and plant species planted on the High Line in New York – an elevated rail line transformed into a linear park.

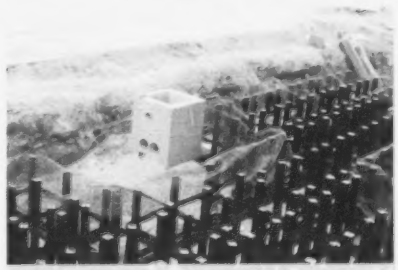


FIG 7.10 Use systems that prevent the compaction of soil and provide room for tree root growth, like on Bloor Street in Toronto.

Case Study

FIG 7.11 Installation of underground Silva Cells in I-205/Portland Mall Light Rail Project helps support healthy tree growth and filter rainwater.

FIG 7.12 Reclaimed granite helped create this bench in the I-205/Portland Mall Light Rail Project.

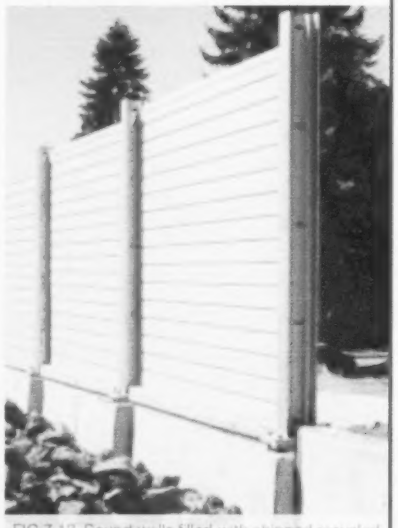


FIG 7.13 Sound walls filled with chipped recycled tires, I-205/Portland Mall Light Rail Project.

TRIMET'S I-205/PORTLAND MALL LIGHT RAIL PROJECT
PORTLAND, OREGON

TriMet's environmental initiatives range from business and vehicle operations to maintenance and construction processes. TriMet undertook several initiatives during MAX Green Line construction in downtown Portland and along I-205. Sustainability practices on the I-205/Portland Mall Light Rail Project included:

Reuse and reduction of materials

- Reused 30,000 cubic yards of existing materials.
- Installed sound walls filled with chipped recycled tires, diverting 9,030 tires from landfills.
- Used rock covered slopes in place of concrete retaining walls.
- Reused removed granite was reused for public art sculptures.

Installation of renewable energy sources

- Approximately 70% of the site's power is provided by renewable energy.
- The terminus acts as educational space with highly visible renewable energy sources and stormwater filtration systems.
- Wind turbines are mounted on top of the light rail's catenary poles.

Enhancement of stormwater treatment

- Stormwater runoff is treated through bio-filtration planters and landscaped areas.
- Bioswales and dry wells work together to filter rainwater and gradually release it into the soil to replenish ground water.

Careful selection and planting of street trees and landscaping

- Use of Silva Cells on station platforms – filters rainwater and supports healthy tree growth.
- Landscaping suitable for the climate and requires minimal maintenance.

Reduction of vehicle emissions

- Project construction vehicles used a B20 biodiesel blend (20 percent biodiesel, 80 percent petroleum diesel), reducing the emission of carbon dioxide and toxic compounds into the air.

CATEGORY

SUCCESSFUL IMPLEMENTATION

Successful implementation strategies to ensure the realization of the mobility hub vision.

The full realization of a mobility hub requires not only the articulation of a vision and completion of high-quality transportation and land use plans, but also the necessary partnerships between private and public stakeholders.

Successful planning requires a multidisciplinary approach, right from the beginning. This means assembling a team of experts in many areas including transportation, land use and real estate in order to create a plan that optimizes the value created by the transit investment in the area from a social, environmental and economic perspective. In addition, successful implementation requires the public sector to take a leadership role, facilitating private sector partnerships and fostering investment by demonstrating commitment to the vision and creating certainty for investors.

As shown throughout this document, a mobility hub should be planned taking into account transportation, land use and environmental considerations. Ultimately, a mobility hub must attain balance between its transportation and placemaking functions. However, these elements (transportation, land use and environment) need to be, from the onset, integrated into a real estate framework and delivered through an implementation strategy that sets out the mechanisms needed to accomplish the mobility hub vision as well as the roles and responsibilities of the stakeholders involved (see Figure SI.1). A successful mobility hub implementation strategy will:

- Identify distinct functions of mobility hubs
- Identify key development areas and opportunities for revenue-generating initiatives
- Identify development opportunities
- Define appropriate tools and incentives
- Identify and form strategic partnerships
- Identify leaders and champions
- Define stakeholder roles and responsibilities

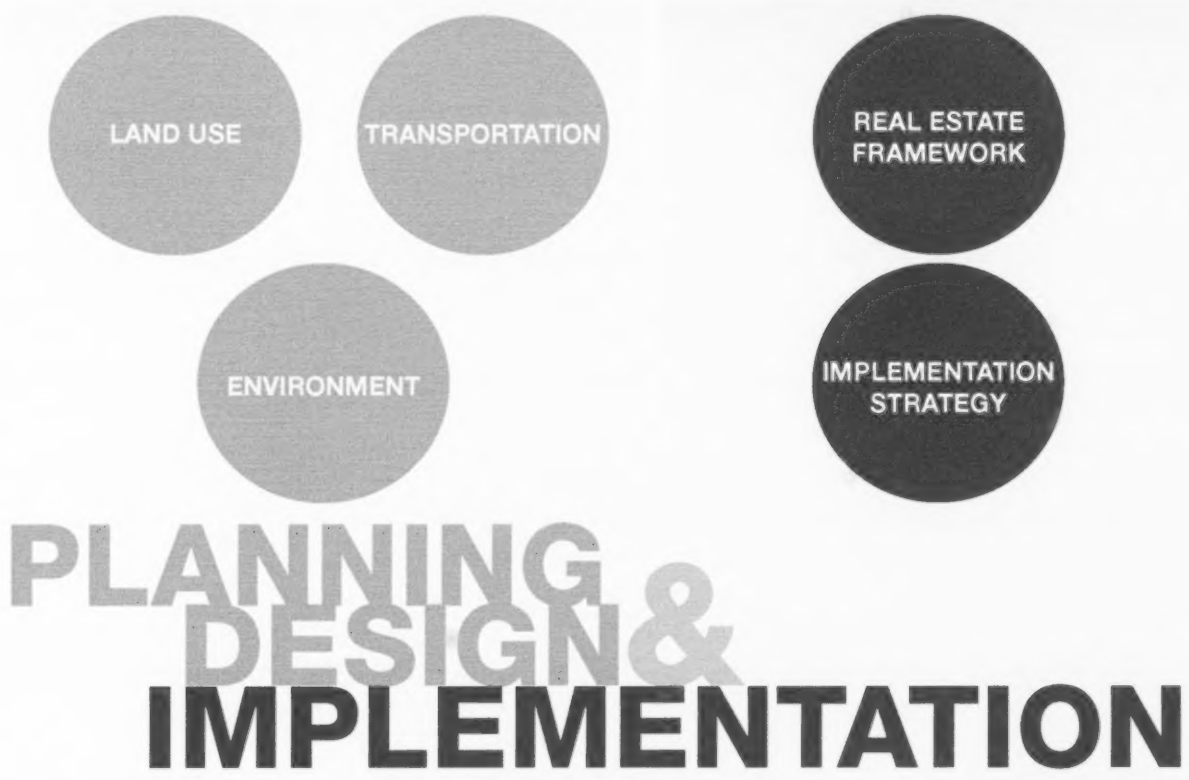


FIG SI.1 Elements of a successful mobility hub implementation strategy.

CATEGORY

SUCCESSFUL IMPLEMENTATION

Objectives 8 and 9 of these Guidelines outline a number of tools to create implementation strategies that foster investment, leverage public investments in infrastructure, and create social, environmental, and economic value for communities around mobility hubs, businesses, and the transit user. The case study below offers an example of an integrated approach that brings together all the elements of sustainable land use and transportation planning and a real estate framework that ensures the private sector support needed for successful implementation.

Case Study

ESTABLISHING SUCCESSFUL JOINT DEVELOPMENT PROGRAMS LESSONS FROM WASHINGTON, D.C, WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY (WMATA)

The WMATA Metrorail system serves a population of 3.4 million with 160 km of track and 86 stations, with over 1 million bus and rail passengers a day.

Between 1976-2003, WMATA was involved in 52 joint development projects, with a total market value of US$4 billion dollars. These 52 projects generated more than US$15 million dollars (in 2003 $) in annual revenue for WMATA, and have also generated 50,000 new transit riders daily.

FIG SI.2 WMATA Silver Spring Joint Development Project, Silver Spring, Maryland.

Key Factors for Success:

- An explicit focus on real estate development and TOD, including:
  - Policies that support those goals
  - Real estate development staff integrated with station planning staff
  - Process to give developers certainty and a reason to be involved
- Ownership of land (most often surface parking lots) and the ability to acquire land for development-related purposes
- The presence of urban growth management policies and supportive local zoning

CATEGORY

SUCCESSFUL IMPLEMENTATION

OBJECTIVE

Flexible planning.

8

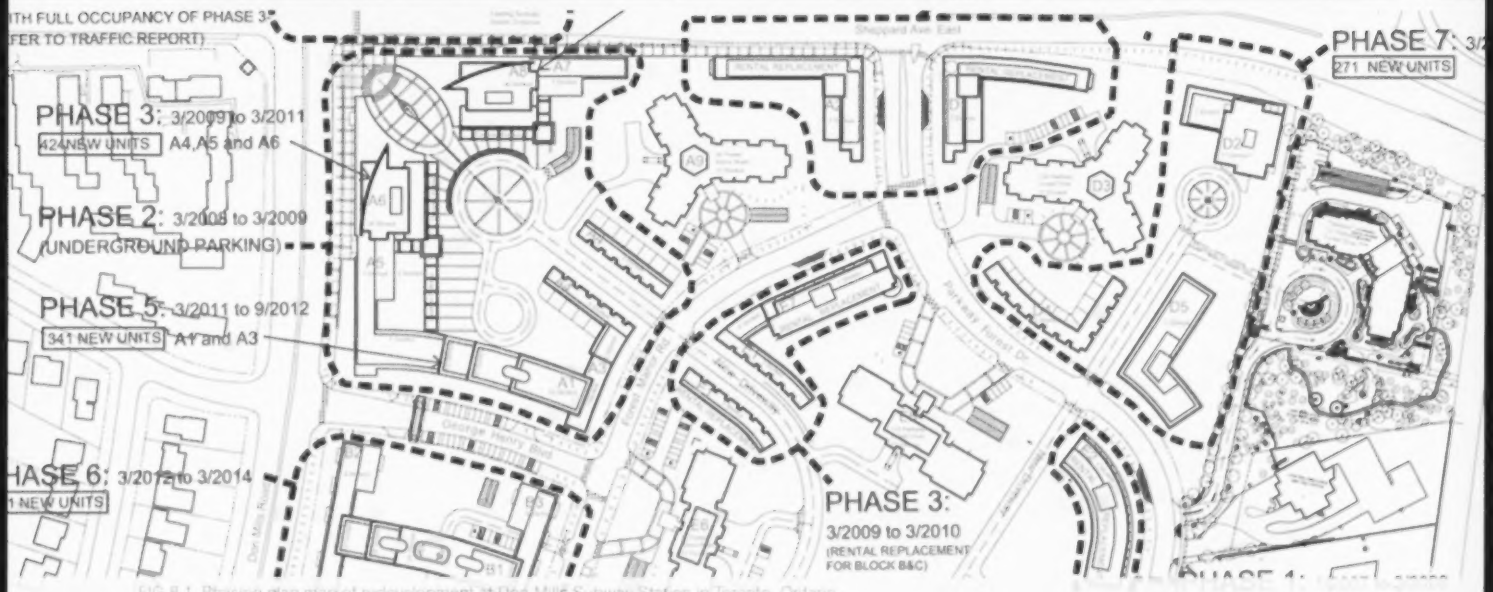


FIG 8.1 Phasing plan map of redevelopment at Don Mills Subway Station in Toronto, Ontario.

Flexible planning to accommodate growth and change.

Given that many mobility hubs are in an early stage of development, detailed phasing strategies are required to plan how infrastructure improvements and development will occur over time in a coordinated manner. In addition, feedback through performance measures and reviews will be needed to ensure a responsive and timely planning process.

THEME ONE

DESIGNING WITH CHANGE IN MIND

8.1 Develop detailed phasing strategies connected with infrastructure improvements.

THEME TWO

A RESPONSIVE PLANNING FRAMEWORK

8.2 Develop performance measures to evaluate and monitor implementation progress connected to the phasing strategy.

8.1 Develop detailed phasing strategies connected with infrastructure improvements.

Approaches

8.1.1 Include phasing plans that outline density and transportation target-based phasing.

8.1.2 Provide visualizations of streetscapes and built form to clearly articulate community vision.

8.1.3 Include coordination strategy with parallel planning processes, such as official plans, secondary plans, and transit project assessments.

8.1.4 Base phasing plans on the full implementation of local transportation master plans and The Big Move.

8.1.5 Develop phased and interim zoning bylaws and designations for mobility hub areas, timed with implementation of rapid transit infrastructure and achievement of density targets to provide guidance and certainty to developers. U3 U4 U5

- Allows for the screening out of undesirable land uses and development that is incompatible with the vision of mobility hubs in preliminary development phases, such as drive-throughs, large-format big box retail, heavy industrial uses, car dealerships and other auto-related uses.
- Provides for regular periods of review of interim bylaws and requirements to ensure they are reflective of development needs and context.

8.1.6 Include interim use provisions in zoning bylaws to support phasing strategies in development. U3 U4 U5

- To allow for uses that otherwise may not be permitted in the ultimate phase of development, but are required for the viability of initial development stages.
- Interim uses should be justified on a case-by-case basis and include timelines and an ultimate development plan to ensure consistency with land use and transportation objectives.
- Designate surface parking as an interim use, and secure regular review periods to ensure that parking supply is justified. 4.4 4.6

Benefits

- Ensures coordination between the planning and implementation processes.
- Provides a framework for orderly and efficient development.
- Supports near-term development needs while maintaining long-term vision and objectives.
- Provides certainty and clarity on planned development and infrastructure to the public and developers.

Applicability

All Mobility Hubs

- Where development is in a nascent stage, phasing strategies will be important to provide a realistic plan to move the master plan forward.
- In areas where development is at a mature stage, phasing strategies should focus on how hub areas will respond to changing transit infrastructure.

Tools & Resources

- City and County of Denver, TOD Station Area Strategies, Implementation/Phasing Toolbox & Matrix – Section 3.3 Phasing Strategies

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

8.1.7 **Develop and implement interim transit service plans that would support and ultimately be replaced by the regional rapid transit network.**

- Provide improved transit infrastructure to build transit ridership in advance and clearly identify rapid transit corridors with features such as:
  - » High quality and enhanced transit stops.
  - » Transit priority and dedicated lanes. 1.5
- Create a communication and consultation strategy to inform the public and stakeholders of rapid transit plans, phasing, and community impacts.
  - » Adopt marketing and branding campaigns.
  - » Coordinate and demonstrate link between transit planning initiatives with community planning.

8.1.8 **Ensure transit station designs provide flexibility for change as the rapid transit network is implemented.** 3.0

- Design future station expansions to accommodate and reduce the cost of adding new rapid transit lines or services, such as:
  - » Providing knock-out walls to future connections or station areas;
  - » 'Roughing in' or protecting property for future station areas; and
  - » Designing station areas to be easily retrofitted for expansion.
- Discourage over-building of transit facilities, particularly when not justified by ultimate phasing.
- Consider temporary facilities to meet needs in near term or ensure that built facilities can be re-used or easily redeveloped, including:
  - » Temporary feeder transit terminals at interim terminus stations; or
  - » Temporary station buildings if station is envisioned to be incorporated into development.

Case Study

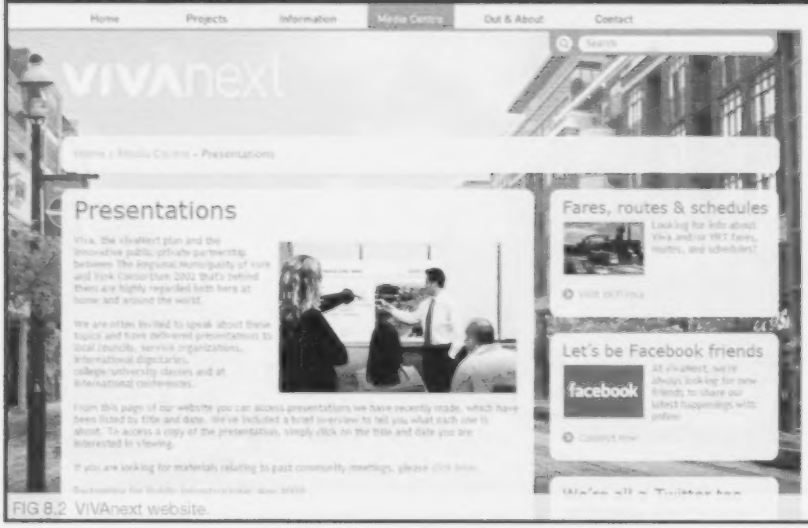


FIG 8.2 VIVAnext website.

VIVANEXT

- Adopts branding of BRT network in York Region to market next phases of rapid transit.
- Provides a central location for information and consultation on York Region's rapid transit network.

8.1.9 For all large-scale developments, require the development of phasing strategies in development plans that include density and mode-share targets connected to implementation of transit and transportation infrastructure.

- The phasing plan should answer the following questions:
  - How will development phases be coordinated with implementation of mobility infrastructure, including rapid transit? 2.1 2.2
  - How will the development's parking supply respond as parking requirements are reduced? 4.4
  - What are the development density targets and mobility benchmarks, including non-auto mode splits, for each phase of development? 2.1 2.2 4.5 6.0

8.1.10 Develop a land assembly and property acquisition plan to secure lands for future development in a land bank and release them as prior development phases meet land use and mobility targets. 4.5 6.5

- Identify potential sites for future development through market assessment studies and development plans and acquire them as they are put for sale.
- Lease-back or allow for interim development on these acquired lands to provide a revenue stream to offset land carrying costs.
- Provide opportunity for public sector agencies and municipalities to exercise greater control of phasing and subsequent development to reflect the master plan.

8.1.11 Coordinate infrastructure implementation and rehabilitation plans with development phasing between municipalities, provincial ministries, and transit agencies.

- Review plans between stakeholders to ensure infrastructure is supportive of mobility hub goals and objectives.

8.2 Develop performance measures to evaluate and monitor implementation progress connected to the phasing strategy.

Approaches

8.2.1 **Adopt road and transit network performance measures to evaluate progress and quality of the transportation network.**

Performance Indicator	Description	Goal	Related Objectives/ Guidelines
Mode share	Transit or non-auto mode shares	Increase	Guideline 2.1
Vehicle kilometres traveled	Distance traveled by vehicles in mobility hubs annually	Decrease	Guideline 2.1
Vehicle ownership	Average household vehicle ownership	Decrease	Objectives 2 and 3
Commute time	Average travel time from home to work	Constant/ Decrease/ Increase at a lower rate	Objectives 1 and 2
Parking supply	Supply of parking in mobility hub area, per square footage of office space and number of residential units	Decrease	Objective 4
Transit ridership	Daily, annual, time of day, and mode of transit ridership	Increase	Objectives 1 and 3 Guidelines 2.1, 4.1
Transit reliability	On-time performance of transit	Increase	Guidelines 1.2, 1.5, 2.5
Transit and driving perceptions, satisfaction	Qualitative performance indicator based on travel satisfaction surveys of mobility hub residents/ workers	Improve	Objectives 1 to 4

Benefits

- Qualitative and quantitative measures of performance at mobility hubs to evaluate progress of plan goals, objectives, and policies.
- A holistic approach that includes social, economic, environmental, and mobility aspects of mobility hubs.
- Provides a standard comparative measure of performance across different mobility hubs.
- Performance measures that are directly linked to mobility hub objectives and guidelines.

Applicability

This guideline provides a list of **performance indicators** based upon the objectives and guidelines identified in the Mobility Hub Design Guidelines. They are not an exhaustive list, nor are all indicators required to achieve an adequate evaluation of mobility hub performance.

Evaluations of mobility hub performance should be evaluated on a regular basis, when major infrastructure changes occur, and at planning horizons set out in phasing plans. The **goals** identified in the following approaches reflect the overall objectives within The Big Move and the Mobility Hub Guidelines, as indicated by **related objectives/guidelines**.

Legend

Especially Relevant Urban Typologies

- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

8.2.2 Introduce and evaluate the performance of the pedestrian and cycling network based on the following performance indicators:

Performance Indicator	Description	Goal	Related Objectives/ Guidelines
Mode share	Cycling and walking mode share	Increase	Objective 2 Guidelines 1.3, 1.4
Pedestrian infrastructure	• Proportion of roadways with sidewalks on both sides of street • Crosswalk improvements • Street amenity improvements	Infrastructure based targets that track completion of projects	Guidelines 1.3, 1.6, 2.5
Cycling infrastructure	• Length of bike lanes, cycle tracks, and trails • Connectivity measures to ensure completeness of networks	Increase	Guidelines 1.3, 1.4, 1.6, 2.3, 2.4, 2.5
Safety and security	• Number of pedestrian and cycling injuries and fatalities • Surveyed perceptions of safety and security	• Decrease • Improve	Guidelines 1.6, 2.2, 2.5

Tools & Resources

- California Transit Oriented Development Database
- Measuring the Performance of Transit-Oriented Developments In Western Australia
- Developing Transportation Performance Measures for Seattle

8.2.3 **Measure demographic and economic performance on the following indicators to evaluate progress in achieving land use and economic goals and objectives.**

Performance Indicator	Description	Goal	Related Objectives/ Guidelines
Population and housing density	The target number of residents and density	Meeting density targets set in the Growth Plan	Objective 5
Number of jobs by sector	Diversity and number of jobs	Meeting jobs density targets	Objective 5
Average household and disposable income	Household and disposable income levels	Increased disposable income resulting from reduced transport costs	Objective 2
Average property values	Property values of housing and office rents	Increase to reflect increase in mobility	Guideline 8.3
Home ownership versus rental	Mix of rental and owner-occupied housing	Balanced mix	Objective 5 Guideline 8.1
Quality of life perception	Satisfaction with living and working in mobility hub areas	Satisfaction rates should be increasing	All

8.2.4 **Measure environmental performance of mobility hubs to evaluate progress in achieving environmental goals and objectives.**

Performance Indicator	Description	Goal	Related Objectives/ Guidelines
Energy consumed by sector	Amount of energy consumed by sector, including transportation	Growth in line with regional average, reduction in transportation sector	Objectives 2, 7
Greenhouse gas emissions generation	Greenhouse gas emissions by sector, including transportation	Overall reduction in GHG production at mobility hubs	Objectives 2, 7
Tree canopy cover	Amount of tree cover as a proportion of hub area	Increase	Objective 6 Guidelines 2.2, 4.8, 7.2

- Develop a tracking database of development performance and details to serve as an information tool for developers, planners and other users.

FIG 9.1 Installation of underground Silva Cells in I-205/Portland Mall Light Rail Project helps support healthy tree growth and filter rainwater.

Effective partnerships and incentives for increased public and private investment.

A mobility hub is successful when it attracts sufficient jobs and residents to create a vibrant, transit supportive place. In order to ensure the success of a mobility hub, strategies should be flexible, designed to respond to the diverse nature of the station areas, their surrounding community contexts, and the dynamic nature of GTHA's development market. This will require considerable understanding of development, sophistication in inter-government and agency relations, skill at relating to surrounding communities, as well as an appetite for risk and 'deal-making'.

THEME ONE
ENHANCING DEVELOPMENT POTENTIAL AND ATTRACTING DEVELOPERS

9.1 Encourage development by providing developer incentives such as height and density exchange, flexible zoning and through mechanisms like bonds, debentures, and Tax Increment Financing (TIF).

9.2 Plan public investment and infrastructure to create and/or enhance development potential.

THEME TWO
ESTABLISHING PARTNERSHIPS BETWEEN STAKEHOLDERS

9.3 Engage in joint development and other public-private partnership models to capture the land value uplift from transit infrastructure investments.

THEME THREE
INCENTIVES FOR DESIGN INNOVATION & EXCELLENCE

9.4 Establish a development checklist as a tool for new development and retrofits in the mobility hubs.

9.5 Consider design competitions for public facilities and incorporate design review panels into the municipal development approval process.

9.1 Encourage development by providing developer incentives such as height and density exchange, flexible zoning and through mechanisms like bonds, debentures and Tax Increment Financing (TIF).

Approaches

9.1.1 Provide developer incentives such as "height and density exchange".

Additional building height and density can be exchanged for facilities, services or matters as set out in a municipal by-law. This tool is also commonly known as density bonusing.

To use section 37 of the Planning Act, municipalities require official plan provisions. The exchange of height and density for community benefits will reflect the specific needs of the community choosing to implement this planning tool.

- At grade publicly accessible meeting places.
- At grade publicly accessible pedestrian links between transit stations and other land uses.
- Grade related land use which would animate pedestrian access routes to transit stations.
- Specific publicly accessible facilities that positively contribute to community development within a mobility hub.

9.1.2 Provide property tax mill rate grants to encourage non-residential uses.

- Provide grants to non-residential use building owners to decrease net property taxes payable.
- Grants should be based on part of assessed value premium for transit station proximity.

9.1.3 Provide municipal bonds.

- To fund community services for high density redevelopment.
- To expedite municipal infrastructure delivery needed for high density development.

Benefits

- Private funding for protection of vulnerable sites.
- Reduces demand for zoning variances.
- Private investment in public amenities.
- Certainty for developers.
- Flexibility with public expenditures.
- Stimulates private development.
- Higher land values from investment.
- High-density to support transit, compact and sustainable communities.

Tools and Resources

Ministry of Municipal Affairs and Housing - Municipal Planning & Development Tools:

- Development Permit System: http://www.mah.gov.on.ca/Page4755.aspx
- Municipal Planning and Financial Tools for Economic Development Handbook: http://www.mah.gov.on.ca/Page9392.aspx

Legend

Especially Relevant Urban Typologies
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- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
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- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies
- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference
- ALSO REFER TO GUIDELINE

Case Study

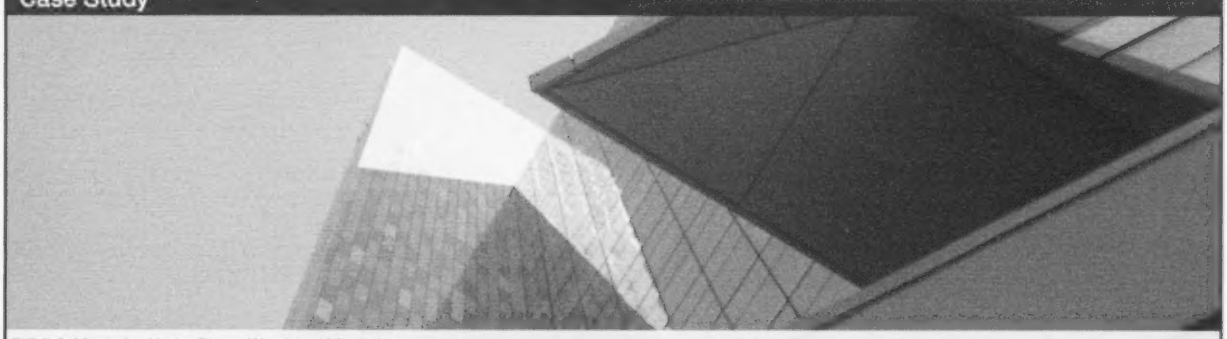

FIG 9.2 Manitoba Hydro Place, Winnipeg, Manitoba.

ESTABLISHING DEVELOPMENT CORPORATIONS AND PUBLIC-PRIVATE PARTNERSHIPS TO STIMULATE PRIVATE INVESTMENT WINNIPEG, MANITOBA

In response to Winnipeg's downtown physical decay, declining property values, and declining residential population for many years, the City responded by creating a new private-public planning and development corporation called the CentreVenture Development Corporation. With $3 million in startup capital funding provided by the City of Winnipeg, $500,000 (received over two years) from the Province of Manitoba and net proceeds from selling surplus City-owned land, the corporation has stimulated $25 million in private investment in the downtown area. The instruments the organization has available to catalyze housing projects include the **Urban Development Bank and the Heritage Tax Credit**.

The purpose of the Urban Development Bank is to provide "creative financing" that will allow promising projects that would not normally qualify for financing from conventional sources to go ahead. **The corporation's financial assistance can take the form of gap financing, loan guarantees, or forgivable loans**.

Gap financing means providing funds to cover the shortfall after conventional financing, the developer's equity, and funds from any other public initiative are tallied up. **Loan guarantee** is when the corporation does not offer a loan directly to the project developer but deposits money or co-signs a loan with the private lender that has agreed to finance the project as collateral on behalf of the project developer. For both types of loans, the corporation usually charges an interest rate similar to a conventional lending institution. **Forgivable loans** are loans that do not have to be repaid and are therefore essentially grants made to the developer under certain conditions.

The **Downtown Heritage Tax Credit**, which is administered by CentreVenture in cooperation with the City of Winnipeg, is meant to stimulate capital investment in the conservation and adaptive reuse of historical buildings in the heart of the city. The tax credit is provided to property owners who invest in the restoration, repair and reuse of designated heritage buildings and is calculated on the basis of 50 per cent of the net private investment made in eligible work.

In Ontario, the City of Brantford has directly provided Wilfrid Laurier University grants or sold public buildings to the University at lower than market value to stimulate the conservation and adaptive reuse of heritage buildings within the Downtown.

9.1.4 **Implement municipal approval fastracking measures, such as a Development Permit System (DPS).**

9.1.5 **Implement a Development Permit By-Law/System (DPS).**

- DPS is a streamlined review and approval system (combined zoning, site plan control and minor variances) that can be applied to all or parts of a municipality, which allows for variations from minimum and maximum standards for height, density and lot area. It permits a range of conditions to be imposed before permit issuance or on the issuance of a permit. This framework allows municipalities to establish up front development rules and, once a DPS is in effect, third party appeals cannot be made to the Ontario Municipal Board.

9.1.6 **Apply municipal parkland reserve funds.**

- Give locations close to transit stations priority for fund use.
- Use for publicly accessible meeting places by stations.
- Focus on stations/locations without attractive outdoor meeting places.

9.1.7 **Provide infrastructure interim financing.**

- Consider the use of interim financing by regional governments where they interim finance their development charge for hard services (water, sanitary and stormwater facilities) in exchange for high density development in mobility hubs.
- Interim financing should cover draft plan of subdivision to occupancy permit time period.
- Will encourage high density development in suburban mobility hubs.

9.1.8 **Establish municipal brownfield grant programs such as the Community Improvement Plan grant under Section 28 of the Planning Act.**

- Facilitates the cleanup of brownfield sites.
- Spurs redevelopment of presently contaminated sites.

9.1.9 **Establish a special purpose body for mobility hubs.**

- Municipalities have established special purpose bodies, such as development corporations to manage land to fulfill specific objectives.
- They provide either one or a specific range of public services required to encourage, facilitate and support mobility hub development or redevelopment (e.g., Toronto Parking Authority).

The Development Permit System in Ontario

A Development Permit System (DPS) is a valuable planning tool used to encourage development and reduce associated processing times. A DPS combines zoning, site plan approval and minor variance processes into a single application and approval procedure.

Since 2007, the Ontario Planning Act allows municipalities to establish a DPS. In order to set up such a system, specific Official Plan policies must first be established, followed by a Development Permit By-law.

For more information, consult the DPS resources from the Ministry of Municipal Affairs and Housing, available at:

http://www.mah.gov.on.ca/AssetFactory.aspx?did=6131

Case Study

BRAMPTON'S MAIN STREET NORTH DEVELOPMENT PERMIT SYSTEM (DPS)

BRAMPTON, ONTARIO

The City of Brampton developed a DPS a part of the new planning framework for the downtown Main St. North area. This area is classified as a "Distinct Character Area" due to its heritage features and primarily residential composition. The area, however, is transitioning towards a mixed-use neighbourhood, with most development and redevelopment expected to occur within existing buildings or as additions to buildings. The Main St. North DPS will allow for such changes to take place more expediently by combining zoning, site plan and minor variance approvals into a single approvals procedure.

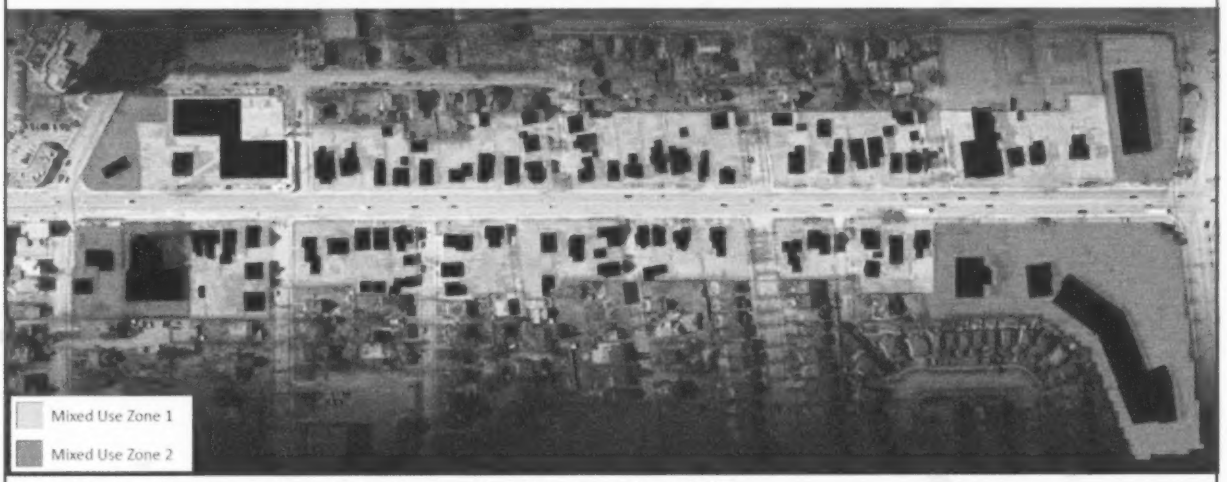

FIG 9.3 Main Street North proposed land use plan (Main Street North Urban Design Study – 2007).

The Main St. North Urban Design Study (2006) established a range of guidelines advocating the maintenance of the area's heritage character, support a mix of uses, provide streetscape improvements, and support transit ridership and pedestrian activity. Accordingly, the City incorporated these guidelines into the new Development Permit By-law.

Brampton's Development System By-law identifies five distinct "districts," representing diverse types of land uses, and establishes unique requirements for each of these. The five DPS districts are:

1. Central Area Mixed Use Two
2. Central Area Mixed Use Three
3. Residential Single Detached B
4. Institutional One
5. Open Space

Overall, the policies and requirements set out in the Development System By-law support a vision for Main Street North to maintain and enhance the existing historic built character of Main Street North while also supporting new investment and redevelopment along the corridor and encouraging land use intensification that is sensitive to the unique historic character of the site.

Urban Form Case Study: Prepared by the Government of Ontario specifically for Places to Grow

PROVIDING DEVELOPMENT FLEXIBILITY (DENSITY, HEIGHT, LAND USE AND APARTMENT TYPOLOGY) TO THE DEVELOPER WITHIN A MUNICIPALLY APPROVED SITE-SPECIFIC COMPREHENSIVE DEVELOPMENT PLAN

VICTORIA, BRITISH COLUMBIA

FIG 9.4 Selkirk waterfront community in Victoria, BC includes affordable housing in the development mix.

The Selkirk Waterfront Community is an award-winning, pedestrian-oriented, mixed-use, brownfield redevelopment project that includes affordable housing and sustainable building and landscape development. Residences are largely four-storey buildings with units that range from 74 sq.m to 195 sq.m (800 sq.ft to 2100 sq.ft) and townhouse units that allow for live/work arrangements. The variety of housing accommodates diverse residents and household types.

RESIDENTS AND JOBS PER HECTARE	245
RATIO OF JOBS TO RESIDENTS	1:0.4
GROSS RESIDENTIAL DENSITY	32 units/ha (13 units/ac)
SITE AREA	9.7 ha (24 ac)
LAND USE	**Residential:** 228 condominium townhouses and apartments, 45 non-market housing, 41 assisted care **Commercial Retail: 9,290 sq.m (100,000 sq.ft)** Commercial Office: 27,870 sq.m (300,000 sq.ft) Light Industrial: 1.6 ha (4 ac)
MAXIMUM HEIGHT	6 storeys
TRANSIT	Local bus service
PARKING	Residential parking is underground 260 off-street, 190 on-street, 450 in structured parking

The City of Victoria's Comprehensive Development (CD) Zoning By-law requires a municipally approved site-specific Comprehensive Development Plan and accompanying guidelines to direct and shape the development.

Specifically, the CD zone:

- Allows the developers to transfer some of the floor space allocation for office/commercial to residential;
- Lets the developer use height and massing dimensions, not floor area ratio or floor space ratio, as the main building criteria to create architectural layouts within the building envelope; and
- Provides the developer with some flexibility as to what density and types of suites are developed and gives the municipality security that what is approved as the CD zone plan and design guidelines will direct development.

The Selkirk Waterfront plan was the first Comprehensive Development Plan undertaken and approved by the City of Victoria. It established a number of precedents that have shaped the City's approach to community development and approvals, including an extensive community consultation process and the use of a 'Form Based Code'. As a result, the City now requires all developers to consult with local neighbourhood stakeholders before submitting a development permit application.

Case Study

FIG 9.5 York University, Toronto, Ontario.

ESTABLISHING UNIVERSITY DEVELOPMENT CORPORATIONS TO FACILITATE PRIVATE / INSTITUTIONAL DEVELOPMENT ON UNIVERSITY OWNED LANDS

York University has established the York University Development Corporation (YUDC) to develop the University's land holdings for York University's benefit. YUDC owns and manages a retail complex entitled York Lanes, and managed the construction of a multi-use building containing the Provincial Archives, the York University bookstore, and York University's research tower. This Corporation facilitated private sector and institutional development on university-owned lands on a land lease basis (e.g. Tennis Canada Rexall Centre, Seneca College's community college building, Seneca@York).

9.2 Plan public investment and infrastructure to create and/or enhance development potential. 4.1

Approaches

9.2.1 Encourage land uses that promote transit and land use reciprocal benefits.

- Encourage major public services to locate within mobility hubs to:
  - » Build transit ridership; and to attain the service benefits from transit.
- Major public services and facilities could include:
  - » Government offices, educational facilities, institutions and social services.

9.2.2 Encourage senior levels of government to lead by example.

- Public Works and Government Services Canada should capitalize on federal transit investment by locating federal facilities close to transit stations.
- Ontario Realty Corporation and Infrastructure should capitalize on provincial transit investment by encouraging provincial facilities to locate within mobility hubs.
- The public facilities could include:
  - » Hospitals, courthouses, Service Ontario office clusters and administrative offices.

Benefits

- By assuming a leadership position in the development of public facilities and public service employment uses within mobility hubs to leverage its investment within transit infrastructures, the public sector will set the framework and the creation of high quality, animated and functional multiple use places.
- Increased walking, cycling, car pooling and transit utilization by people working at facilities relocated or developed within mobility hubs.

Case Study

FIG 9.6 Portland Downtown Streetcar Corridor, Portland, Oregon.

TRANSIT AND LAND USE RECIPROCAL BENEFITS
PORTLAND, OREGON

The Portland Downtown Streetcar Corridor was designed to redevelop and intensify land uses along a streetcar line in Portland, Oregon. The introduction of the streetcar line has been a stimulus for increased density and development along the corridor that has provided a mix of residential, commercial, institutional, and other uses. The City was able to finance the construction of the Downtown Streetcar line entirely within its own funding programs, without subsidies from higher levels of government. It achieved this by implementing innovative financing techniques with other planning and development initiatives, including:

The most significant funding initiative to construct the streetcar line involved increasing parking rates within the streetcar corridor by 20 cents per hour. The City then issued bonds backed by the future parking revenues, raising $28.6 million. Following that, the City, in consultation with property owners, agreed to form a Local Improvement District, which provided an additional $19.4 million in capital. Finally, an additional $21.5 million was generated using tax increment financing mechanisms. These three funding arrangements generated over 70 per cent of the required funds with the remaining $33.65 million derived from a mix of other local sources.

Legend

Especially Relevant Urban Typologies
- U1 CENTRAL TORONTO
- U2 URBAN TRANSIT NODES
- U3 EMERGING GROWTH CENTRES
- U4 HISTORIC SUBURBAN TOWN CENTRES
- U5 SUBURBAN TRANSIT NODES
- U6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies
- T1 ENTRY
- T2 TRANSFER
- T3 DESTINATION

Cross-reference
- ALSO REFER TO GUIDELINE

Case Study

FIG 9.7 North York Centre, North York, Ontario.

PROVIDING PUBLIC SECTOR INVESTMENTS TO ATTRACT INVESTMENTS AND GROWTH
NORTH YORK CENTRE

North York Centre is one of four designated centres in the City of Toronto's Official Plan outside of Downtown Toronto.

North York Centre continues to attract both the type of residential population and employment growth that the Growth Plan is seeking to direct to locations which are both designated Growth Centres and mobility hubs. Many innovative approaches and solutions have been implemented within the North York City Centre to attract this additional growth.

The public sector implemented a number of initiatives which established a framework that has and will continue to support additional growth within this Centre. These initiatives include:

- The opening of the Finch subway station in 1974, North York Centre station in 1987 and the subsequent construction of the Sheppard subway line (leading to this Centre);
- Introducing a new civic plaza (Mel Lastman Square) and recreation and cultural amenities (North York Central Library, Douglas Snow Aquatic Centre);
- Planning, financing, and constructing a new collector ring road through the low density residential area around the North York Centre to maintain high quality Highway 401 access to the Centre (via a Secondary Plan, Environmental Assessments, property acquisition and capital budget process);
- Maintaining a landscaped median on the main street (Yonge Street) and requiring wind, as well as sun / shade modeling of new projects within the Centre to ensure that high quality pedestrian level environmental conditions are maintained to encourage people to walk to transit stations;
- Relocating a heritage building (Dempsey House) from a property immediately adjacent to a subway station to newly developed public park (Dempsey Park) outside of the North York Centre area to facilitate higher density development of a property adjacent to Sheppard subway station;
- Retaining federal and municipal government and public school board office functions within this mobility hub;
- Requiring public parkland dedication at a rate of less than 1 ha per 300 dwelling units for new high density residential uses;
- Leveraging private sector development for the new public facilities (Toronto Centre for the Arts, Gibson House Park, Dempsey Park);
- Selling of part of a former school site to generate revenue for new Claude Watson School of the Arts;
- Utilizing road infrastructure efficiently by permitting on-street parking at locations and times when it would not interfere with municipal traffic operation objectives; and
- Requiring proponents of private development to undertake transportation modelling to ensure transit ridership by the project occupants is maximized.

9.2.3 **Encourage facility sharing by institutions.**

- Encourage institutions to share buildings and structures to maximize their utilization on a daily, monthly and annual basis.
- Community agencies and transit facility owners could potentially share the ongoing use of facilities.

9.2.4 **Provide ground lease for building activity.**

- Provide a third party the option to develop or redevelop lands for high density buildings.
- Both institutional and private sector owners could retain long term land ownership of their respective property with a ground lease option.
- Mechanism for facilitating development without a change in land ownership.

9.3 Engage in joint development and other public-private partnership models to capture the land value uplift from transit infrastructure investments.

Approaches

9.3.1 Encourage joint public and private sector building occupancy.

- The joint occupancy of buildings by both the public sector and private sector for different but compatible land uses should be encouraged to achieve higher density buildings and diversity of land uses in proximity to transit stations.

9.3.2 Coordinate and integrate public and private pedestrian paths.

- Direct weather protected pedestrian access routes to transit stations from buildings containing employment uses should be developed through public-private partnership in cases where the routes cross public streets or publicly owned lands. If private sector buildings proceed before a planned future transit station or prior to the public sector funding being available, the private sector building should be designed so that it contains the ideal access point connection (building entrances, underground knock out panels) to the future planned access route.

9.3.3 Explore leasing transit station space to third parties.

- At the transit station planning stage, the feasibility of leasing part of the transit station site or space within transit station buildings to the private sector or other institutions to animate the Primary Zone of Influence of the mobility hub should be considered. This study should address feasibility of these third party uses over both the short and long term.

Benefits

- Provides revenue for public agencies from joint development initiatives.
- Stimulates private development.
- Higher land values from investment.
- High-density to support transit, compact and sustainable communities.
- Flexibility with public expenditures.

Case Study

FIG 9.8 Toronto District School Board joint development at North Toronto Collegiate.

LEASE / SELL SCHOOL LANDS FOR HIGH-DENSITY DEVELOPMENT – TORONTO DISTRICT SCHOOL BOARD, TRIDEL HIGH-DENSITY DEVELOPMENT

Toronto District School Board could lease or sell part of their school site located within any of the mobility hubs to a third party for higher density development and to generate revenue to fund capital improvements required for their school facilities. The Toronto District School Board received a significant capital return from the sale of part of the North Toronto Collegiate Site to Tridel for a new residential condominium development.

Legend

Especially Relevant Urban Typologies

- u1 CENTRAL TORONTO
- u2 URBAN TRANSIT NODES
- u3 EMERGING GROWTH CENTRES
- u4 HISTORIC SUBURBAN TOWN CENTRES
- u5 SUBURBAN TRANSIT NODES
- u6 UNIQUE DESTINATIONS

Especially Relevant Transportation Typologies

- t1 ENTRY
- t2 TRANSFER
- t3 DESTINATION

Cross-reference

- ALSO REFER TO GUIDELINE

9.3.4 **Establish various Public-Private Partnership models to stimulate private investment.**

- Municipalities and proponents of high density residential redevelopment within mobility hubs should work in partnership to complete the strategic land assembly required to create a continuous public lane or service road along the rear lot line of redevelopment properties. Fronting onto a main street should be encouraged.
- Public-Private Partnerships involve many models including Design Build Finance (DBF), Design Build Finance Maintain (DBFM) and Design Build Finance Operate Maintain (DBFOM). Public-Private Partnerships have been used successfully for many infrastructure projects for several decades to stimulate private investment.
- Public and private sector land use owners should use long-term ground lease as a mechanism to facilitate the development of their property by a third party without relinquishing the ownership of the property.

9.3.5 **Expropriate land where absolutely necessary to enable higher intensity development.**

- Judiciously use expropriation powers where property owners do not voluntarily cooperate in the land sale transactions required for the infrastructure needed to support higher density redevelopment in mobility hubs. Municipalities should utilize expropriation powers where all other reasonable approaches have been exhausted within a timely manner.
- Expropriation powers should only be used when necessary, recognizing that the use of such powers to enable development may be in the public interest, notwithstanding potential business impacts.

9.4 Establish a development checklist as a tool for new development and retrofits in the mobility hubs.

Approaches

9.4.1 Establish development checklists to ensure that developments conform to desired standards similar to LEED.

Case Study

TORONTO GREEN STANDARD – CHECKLIST

For New Low-Rise Non-Residential Buildings (3 storeys and under).
Complete in conjunction with the full Toronto Green Standard and Specifications.

Section	Development Feature	Tier 1 Required Performance Measure Summary	Description (How is this performance measure being met?)	Reference the Plans, Drawings or Reports
A0.1.1	Pedestrian Infrastructure	Building(s) on the site connected to off-site pedestrian paths, transit stops and parking areas		Site Plan # Landscape Plan # Other #
A0.1.2	Pedestrian Infrastructure	Continuous, universally accessible, barrier-free and clearly designated sidewalks, crosswalks, and walkways		Site Plan # Other #
A0.1.3	Pedestrian Infrastructure	Covered outdoor waiting area(s)		Site Plan # Building Cross-section # Other #
A0.1.4	Pedestrian Infrastructure	Pedestrian-specific lighting		Site Plan # Landscape Plan # Other #
A0.1.5	Pedestrian Infrastructure	Direct pedestrian linkage from the building to adjacent transit stop		Site Plan # Other #
A0.4.1	Urban Heat Island Reduction: All Roofs	One of the following is provided: ☐ High-albedo surface materials OR ☐ Open-grid pavement OR ☐ Shade within 5 years of construction OR ☐ Combination of above 3 options		Landscape Plan # Other #

FIG 9.9 Toronto Green Standards Checklist.

ESTABLISHING CHECKLISTS TO CONFORM TO GREEN STANDARDS

- The Toronto Green Standard (TGS) is a key strategy of the City's Climate Change Action Plan.
- It is a set of performance measures with supporting guidelines related to sustainable site and building design for new development.
- Three different versions, each relating to different building types: Low-Rise Non-Residential, Low-Rise Residential, Mid-High Rise (any use).
- Developers complete the checklist as well as a TGS Statistics Template as part of their complete development application.

Benefits

- Assist municipalities in evaluating and negotiating applications for developments around mobility hubs.
- Ensure uniform interpretation / understanding of mobility hub principles and consistent treatment of development applications.
- Provide the development industry with some direction on the key features and type of development that stakeholders are looking for around mobility hubs.

Applicability

All Mobility Hubs
All Zone of Influence

Tools and Resources

- City of Edmonton User Guide for Transit Oriented Development Checklist
- Toronto's Green Standard Checklist
- York Region TOD Implementation Checklist
- Town of Markham Smart Growth Checklist

Case Study

ESTABLISHING DEVELOPMENT CHECKLISTS TO CONFORM TO DESIRED BUILT FORM AND SMART GROWTH PRINCIPLES

CITY OF EDMONTON TRANSIT ORIENTED DEVELOPMENT CHECKLIST

- Introduced on a trial basis in 2006 and has been used since by planning staff to evaluate the general compliance of plans and rezoning applications with smart growth planning principles.
- Applies to development near TODs near LRT stations and transit centres.
- Aims to encourage the development of 'urban villages' at transit stations /centres.

The Checklist is divided into 6 Sections and points are assigned to the subtopics under each category:

A – Higher Density

B – Mix of Uses

C – Transit and Cycling

D – Streets and Walkability

E – Parking Management

F – Urban Design and Amenities

The Scorecard summarizes the scores from the checklist. Projects may score well in some categories and poorly in others. This summary can assist in identifying aspects of the project which need further investigation and/or redesign.

1
Pre-Application Meeting: Applicant contacts Planning & Development Department to discuss proposed TOD application. Staff provides applicant with Transit nOriented Development Checklist, Information Brochure and User Guide.
2
Applicant prepares and submits TOD application to the Planning & Development Department.
3
Planner conducts a preliminary review and evaluates/scores the TOD application using the TOD Checklist.
4
Planner discusses results/score from TOD Checklist Evaluation with the applicant, and negotiates changes, where necessary.
5
Applicant submits (amended) TOD application.
6
Planner submits report to City Council/Subdivision Authority with summary of TOD Checklist Evaluation.

City of Edmonton
Transit Oriented Development Checklist

Development Application No.: _____ Date: _____
Planner: _____

The subject property must be located within 800 m of a Light Rail Transit (LRT) Station, or within 400 m of a Transit Centre. TOD for Bus Rapid Transit (BRT) Stations may be lower density than for LRT and involve a smaller area (within 200 m of the Station).

A Density

The intent is to concentrate development at transit stations/centres with densities that will support transit and a range of businesses and services. The density and height of development should also decrease with distance from the transit station/centre to ensure compatibility with surrounding lower density residential areas.

	Features	Yes	No	N/A	Comments
A1	Development is high density within 400 m of transit station/centre.	☐	☐	☐	
A2	Development is medium density within 800 m of transit station/centre.	☐	☐	☐	
A3	The height of development decreases with distance from the transit station/centre.	☐	☐	☐	
	Sub-Total				

B Mix of Uses

The intent is to develop "urban villages" at transit stations/centres that have a mix of residential and commercial land uses, as well as other land uses. This mix will offer people opportunities to live and work close to transit, to obtain at least basic/daily goods and services locally, and to use transit to travel to destinations for recreation or education.

	Features	Yes	No	N/A	Comments
B1	The development includes a horizontal or vertical mix of residential and commercial (office/retail) land uses, or adds to the mix of existing uses within the station/centre area.	☐	☐	☐	
B2	The development provides retail space at ground level in buildings located around public squares or along direct routes to transit station/centre.	☐	☐	☐	
B3	The development includes a grocery store.	☐	☐	☐	
B4	The development includes commercial uses that are beneficial and compatible with residential uses (e.g. household furnishings, bookstores, fitness centres, hair salons).	☐	☐	☐	
B5	Residential development includes a mix of housing types and/or housing unit sizes.	☐	☐	☐	
	Sub-Total				

Transit Oriented Development Scorecard

1 point is assigned per item if 'Yes' is checked. 0 points are assigned if 'No' is checked. All 'Yes' and 'No' checks are considered applicable and points from each section should be added and included in the table below. The 'Score' for each section is calculated by dividing the points by the 'Total Applicable'. This produces a percentage score. Comments may be written to explain the score for each section. The final scores are 'graded' into bands (81-90% for instance) and given a corresponding 'star' rating as outlined below.

	Total Possible	Total Applicable	Points	Score (%)	Comments
A Density	3				
B Mix of Uses	5				
C Transit and Cycling	3				
D Streets and Walkability	7				
E Parking	8				
F Urban Design and Amenities	9				
TOTALS	35				
Final Score					

Transit Oriented Development – Scorecard Result Rating System

Insert your 'final score' into the appropriate band below to determine the project's rating, from 5 stars to 0 stars as described below:

Final Score Band	Rating		
91 – 100%	★ ★ ★ ★ ★	5 star	SMART BAR
81 – 90%	★ ★ ★ ★	4 stars	
71 – 80%	★ ★ ★	3 star	
61 – 70%	★ ★	2 star	
50 – 60%	★	1 star	
Less than 50%		No stars	

FIG 9.10 City of Edmonton Transit Oriented Development Checklist.

9.5 Consider design competitions for public facilities and incorporate design review panels into the municipal development approval process. 4.1

Approaches

9.5.1 Municipalities should consider establishing design review panels which make recommendations to the director of planning, development permit board, or city council on any policy or development proposal affecting the community's physical environment.

- Reviews civic works such as bridges, roadworks, parks, beautification projects, transit systems, civic buildings and design competitions.
- The panel provides comments and observations then votes for either "support", "non-support" or "deferral" but does not have the authority to approve or refuse projects or make policy.
- The panel the authority to request changes to proposals to ensure an appropriate contribution to city building and the public realm.

9.5.2 Undertake design competitions to promote excellence in design for transit stations and surrounding developments.

Benefits

Design Competitions

- A means to improve and enhance a site or facility with high-quality design.
- Publicity for the competition brings attention to the initiative, creates excitement and fosters civic pride.
- A competition attracts a wide variety of creative and innovative ideas.

Design Review Panels

- Opportunity to involve recognizable leaders in the field to ensure high-quality standards and design excellence.
- Integrated with municipal process to provide advice to City staff at key decision stages in the development process.

Applicability

All Mobility Hubs
Primary and Secondary Zone of Influence

Case Study

FIG 9.11 Concept Plan for Kipling Interregional Station, Toronto Ontario.

CITY OF TORONTO DESIGN REVIEW PANEL

- The Panel has been involved in Kipling Station Redevelopment since 2007 and has been working continuously on key aspects needing improvement.

Kipling Station Mobility Hub

The City of Toronto Design Review Panel reviewed the Kipling Station mobility hub. The design review panel issued numerous recommendations throughout the project's development which resulted in the design of a multi-modal station with a stronger civic presence, high-quality pedestrian access and ambitious environmental standards. This approach was described as presenting dramatic design solutions to an impossible situation. The Panel indicated that the proponent's increased financial investment in this project will have a significant pay-off in the long term. The Review Panel also provided detailed guidance on the building form and articulation, pedestrian realm and landscape strategy.

APPENDIX I
DEFINITIONS / GLOSSARY OF TERMS

Active transportation
Non-motorized travel, including walking, cycling, roller-blading and movements with mobility devices. The active transportation network includes sidewalks, crosswalks, designated road lanes and off-road trails to accommodate active transportation.

Active uses
Land uses such as retail, coffee shops, storefronts, cafes, restaurants, which keep the area active with pedestrian activity at street level and maintain visual interest are termed as active uses. Provide an additional source of revenue through the lease or sale of the commercial space. Wrapping active uses around a parking structure can mean anything from integrating small newsstands, coffee shops, or corner stores on the main street face to creating parking structures that are surrounded by mixed uses, including government offices, police or public safety substations, larger scale retail, and/or private office space, on 3 or more sides and all levels.

Albedo
The measure of a material's ability to reflect sunlight on a scale of 0 to 1. Albedo determines how much solar energy, and therefore how much heat, a particular substance absorbs. A low albedo material indicates that its surface absorbs most of the solar radiation, and vice versa. The urban heat island effect (high ambient temperatures in downtown environments) is often due to an abundance of conventional paving materials with low albedos, such as asphalt, which absorb significant amounts of heat. The use of materials with high albedos is therefore encouraged in urban areas.

Alternative energy vehicles
Vehicles that operate on a fuel other than the traditional petroleum fuels, such as biofuel, or are powered by something other than petroleum, such as electricity.

Alternative Financing and Procurement (AFP)
The use of private sector involvement to design, finance and/or build infrastructure while ensuring appropriate public control.

Anaerobic digestion
Anaerobic digestion is a series of processes in which microorganisms break down biodegradable material in the absence of oxygen, used for industrial or domestic purposes to manage waste and/or to release energy.

It is widely used as part of the process to treat wastewater. As part of an integrated waste management system, anaerobic digestion reduces the emission of landfill gas into the atmosphere.

Anaerobic digestion is widely used as a renewable energy source because the process produces a methane and carbon dioxide rich biogas suitable for energy production, helping to replace fossil fuels. The nutrient-rich digestate which is also produced can be used as fertilizer.

Anchor hub
Mobility hubs that have strategic importance due to their relationship with urban growth centres (UGCs), as well as Pearson Airport and Union Station due to their roles as the GTHA's primary international gateways. Urban growth centres are identified in the Growth Plan for the Greater Golden Horseshoe as focal areas for directing significant high-density employment and population growth, major transit infrastructure, and a mix of land uses such as commercial, recreational, cultural, entertainment, institutional and public services. As such, they contain current or planned major regional destinations such as major institutions, employment centres, town centres or regional shopping centres, and they have significant potential to attract and accommodate new growth and development. Anchor Hubs have the potential to transform the regional urban structure and act as anchors of the regional transportation system. Anchor Hubs are identified in Schedules 1 and 2 of the RTP. (For more information see the backgrounder "Mobility Hubs, December 2008").

Auto occupancy
The average number of people in a vehicle, derived from the number of persons moved by car, divided by the number of vehicles on the road.

Bi-directional travel
In transportation infrastructure, a bidirectional traffic system divides travelers into two streams of traffic that flow in opposite directions.

Bike and ride
Bike and Ride refers to the use of cycling in combination with transit as a primary mode of mobility. It is an easy and inexpensive way to get to a transit station, bus stop or park and ride lot, and should be promoted as a healthy, sustainable way of moving within a community. Bike and Ride programs allow cyclists to ride to the station, park their bike and enter the transit system. They should have weatherproofed facilities for bicycle storage so that commuters can their bicycle to a station, leave it there, and take a bus or train. Additional amenities include bike repair facilities, washrooms, and water fountains.

Brownfield sites
Undeveloped or previously developed properties that may be contaminated. They are usually, but not exclusively, former industrial or commercial properties that may be underutilized, derelict or vacant.

Bulb-out
A bulb-out is an outward extension to the sidewalk, replacing roadway that would otherwise be used for parking, allowing a vehicle to stay in its traffic lane to let off and pick up passengers instead of pulling over into the curb. Benefits include saved time from vehicles not having to pull back into traffic, reduced sidewalk congestion, less swerving from lane-to-lane, more space for bus shelters and amenities, and easier full length alignment of a bus entrance with a raised curb stop, especially to allow level boarding. Bulb-outs also retain more parking when compared to a bus stop located in a parking lane, where cars can park immediately on either side of the bus stop itself.

Drawbacks include delaying vehicles that must wait behind the bus, especially on streets that provide only one traffic lane in each direction. Care should also be taken when designing bulb-outs to ensure that they do not create dangerous conditions for street users such as cyclists.

Bus Rapid Transit (BRT)
Similar to light rail transit operating predominantly in protected rights-of-way, separate from other traffic, but using advanced bus technology. Also includes buses operating in mixed traffic on controlled-access expressways that employ congestion management such as tolls, thereby allowing the buses to maintain high average speeds. The capacity of BRT is typically 2,000 to 10,000 passengers per hour, peak direction. Average speed: 15 to 40 km/h depending on station spacing, with higher speeds possible on grade-separated rights-of-way on controlled access highways. Example: Vancouver 98B Line (Richmond section), Ottawa Transitway system. City building Is a term to describe the development and redevelopment of the built environment within cities. City building, in the context of this document should be understood as a positive term relating to opportunities for place-making, establishment of integrated, compact, transit and pedestrian supportive communities and the repair of disjointed or underutilized lands.

Chicanes
A traffic-calming measure that involves constructing or retrofitting streets to create a series of tights turns in order to reduce vehicle speeds. Chicanes can be implemented by widening sidewalks and surrounding landscaping, or through the construction of raised islands along the street. In addition to slowing traffic, such measures have various benefits such as discouraging traffic from smaller streets and creating opportunities for additional landscaping. Chicanes are therefore appropriate for smaller streets, which do not act as collectors or accommodate bus routes.

Complete street
Road design philosophy where road space is allocated to safely balance the needs of all road users including pedestrians, cyclists, transit, and motorists.

Co-working
Co-working is a style of work which involves a shared working environment, sometimes an office, yet independent activity. Unlike in a typical office environment, those co-working are usually not employed by the same organization. Typically it is attractive to work-at-home professionals, independent contractors, or people who travel frequently.

Crime Prevention Through Environmental Design (CPTED)
Crime Prevention Through Environmental Design (CPTED) is a multi-disciplinary approach to deterring criminal behavior through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts. As of 2004, most implementations of CPTED occur solely within the built environment.

Curb radii
The size and curve of an intersection corner. A wide curb radius typically results in high-speed turning by motorists. Reducing the turning radius to a tighter turn will not only reduce turning speeds, but it also shortens the crossing distance for pedestrians and improves sight distance between pedestrians and motorists.

Nearby land uses and types of road users should be considered when designing an intersection so that curb radii are sized appropriately. Where there is a parking and/or bicycle lane, curb radii can be even tighter, because vehicles will have more room to make the turn.

Density transfer
A tool predominantly used by the The City of Vancouver to achieve the conservation and legal protection of heritage resources. Involves granting of bonus density in exchange for the rehabilitation and legal protection of a heritage building. When it is not possible to use this bonus density by adding more development on the same site as the heritage building, City Council or the Development Permit Board may authorize it to be made available for transfer to another site where there is opportunity for additional development. The sale of transferable heritage density (bonus and/or residual) generates funds for the owner of the heritage site; this helps defray rehabilitation costs.

The site of the heritage building is called the donor site. The site where the transferred density is to be used is called the receiver site.

Desire lines
Routes that pedestrians will naturally take due to their inherent convenience. Desire lines often manifest themselves as informal paths that are established and regularly used by pedestrians in place of formal paths or sidewalks. Such desired paths are created because they may actually provide more convenient routes when compared to formal walkways. It is important to make sure that pedestrian desire lines are maintained and accompanied with marked crosswalks wherever possible.

District energy
District Energy, also known as District heating and cooling, is the technology for providing heating (and possibly other forms of energy) from a central plant to multiple users. The most common district energy technology originally used piped steam to distribute the energy, but nowadays lower pressure hot water in flexible plastic piping can be used effectively to distribute heating and cooling energy. District energy can save money for the users, conserve resources, reduce pollution, and open up many options for flexible and sustainable energy solutions in the future. Central plants tend to be much more efficient than many small plants, so energy consumption is reduced.

Electronic Fare Payment (EFP)
An automated fair collection and processing system that enables customers to use a variety of media such as magnetic stripe cards, smart cards, or credit cards to pay for transit trips. The cashless system speeds boarding times and simplifies fare collection for the transit operators.

Evapotranspiration (ET)
ET is a term used to describe the sum of evaporation and plant transpiration from the Earth's land surface to atmosphere. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and water bodies. Transpiration accounts for the movement of water within a plant and the subsequent loss of water as vapor through stomata in its leaves. Evapotranspiration is an important part of the water cycle. An element (such as a tree) that contributes to evapotranspiration can be called an evapotranspirator.

Floor Area Ratio (FAR) / Floor Space Index (FSI)
The FAR or FSI is the ratio of the total floor area of buildings on a certain location to the size of the land of that location, or the limit imposed on such a ratio.

As a formula: Floor Area Ratio = (Total covered area on all floors of all buildings on a certain plot)/(Area of the plot).

Thus, an FSI of 2.0 would indicate that the total floor area of a building is two times the gross area of the plot on which it is constructed, as would be found in a multiple-story building.

Fare integration program
When partnerships between different transit authorities in a region are made, a fare integration program may be implemented. A fare integration program enables passengers to use different forms of transport within an integrated, seamless and convenient system. Fare integration approaches can take the form of regional passes, common regional fare structure, and acceptance of major operator's media (tokens, passes) by other operators.

Fare-paid zones
Station or service areas where customers already have paid a fare to reduce need for additional fare validation and payment. Proof of payment may be required in these zones, depending on the transit agency.

Feeder bus routes
A feeder bus route is a bus service that picks up and delivers passengers to a higher order transit station such as a rapid rail transit station, express-bus stop or terminal.

Form-based code
Form-based codes foster predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code. These codes are adopted into city or county law as regulations, not mere guidelines. Form-based codes are an alternative to conventional zoning.

Form-based codes address the relationship between building facades and the public realm, the form and mass of buildings in relation to one another, and the scale and types of streets and blocks. The regulations and standards in Form-based codes, presented in both diagrams and words, are keyed to a regulating plan that designates the appropriate form and scale (and therefore, character) of development rather than only distinctions in land-use types. This is in contrast to conventional zoning's focus on the micro management and segregation of land uses, and the control of development intensity through abstract and uncoordinated parameters (e.g., FAR, dwellings per acre, setbacks, parking ratios, traffic LOS) to the neglect of an integrated built form. Not to be confused with design guidelines or general statements of policy, Form-based codes are regulatory, not advisory.

Gateway hub
All mobility hubs that are not Anchor Hubs. Gateway Hubs are identified in Schedules 1 and 2 of the RTP. (For more information see the backgrounder "Mobility Hubs, December 2008").

Greater Toronto and Hamilton Area (GTHA)
The metropolitan region encompassing the City of Toronto, the four surrounding Regional Municipalities (Durham, Halton, Peel and York) and the City of Hamilton.

Greenfield development
Greenfield development is the creation of planned communities on previously undeveloped land. This land may be rural, agricultural or unused areas on the outskirts of urban areas. Unlike urban sprawls, where there is little or no proper suburban planning, greenfield development is about efficient urban planning that aims to provide practical, affordable and sustainable living spaces for growing urban populations. The planning takes future growth and development into account as well as seeks to avoid the various infrastructure issues that plague existing urban areas.

Height and density exchange
Also called density bonusing, this tool offers developments a level of density that surpasses the allowable Floor Area Ratio (FAR). In exchange for increased height/density that surpasses the zoning by-law, developers are required to provide a service or benefit to the community as negotiated by the municipality such as amenities or housing needed by the community. Density bonusing policies must be written into a municipality's Official Plan in order for it to be used as a development tool.

Higher order transit
Transit that generally operates in its own dedicated right-of-way, outside of mixed-traffic, and therefore can achieve a frequency of service greater than mixed-traffic transit. Higher order transit can include heavy rail (such as subways), light rail (such as streetcars), and buses in dedicated rights-of-way. It includes all forms of rapid transit, and both terms are often interchangeable.

High Occupancy Vehicle (HOV) lanes
A roadway lane designated for use only by vehicles with a specified minimum number of occupants, usually two or three. HOV lanes can also be opened to buses.

'Hub and spoke' radial transit networks
Fixed-route transit systems in which the Central Business District (CBD) is the central node of the system, with various routes radiating from this centre. Radial systems are designed to reach the maximum number of residential and employment districts within an urban area. However, as the distance from the CBD increases, the frequency and range of service decrease as a result of decreasing densities.

Infill
Infill is the term used for new development within existing communities on previously underutilized sites, typically at a higher density. Good infill developments fit in seamlessly within the existing urban fabric, and the contributing elements include: setback – the distance from the front facade of the house to the street and should be the same distance as other houses on the street, height – which should be compatible with the height of buildings surrounding the lot, and mass – the bulk of the house.

Intelligent Transportation Systems (ITS)
The use of real-time computer/communications/information technology for advanced, traffic-responsive, area-wide traffic control and to provide information which allows transportation providers to optimize transportation system operations and enable travellers to use the system more efficiently and effectively, while also increasing their convenience and ease of travelling.

Intensification
The development of a property, site or area at a higher density than currently exists through:
a) Redevelopment, including the reuse of brownfield sites
b) The development of vacant and/or underutilized lots within previously developed areas
c) Infill development
d) The expansion or conversion of existing buildings

Intermodal transit hub
Stations or centres where different transit modes come together and allow for easy transfers from one mode to another. They can also facilitate transfers at different scales: local, regional and intercity.

Intersection density
Walkable communities are measured by the "intersection density" also referred to as street-grid density or simply grid-density. This is determined by calculating the number of intersections in a given area. Typically, the more intersections per area, the greater the degree of connectivity and more route options are available. This is also a surrogate for infrastructure costs; i.e.: relates to the cost of the infrastructure reaching more people with less footage.

LEED (Leadership in Energy and Environmental Design)
A green building rating system, since expanded to rate neighbourhood development. Buildings can qualify for four levels of certification related to environmentally sustainable construction. Certification is granted by the Green Building Council based on an application documenting compliance with the rating system requirements, as well as paying registration and certification fees.

Legible space
The measure of navigational clarity of spaces through the logical layout and design of physical elements.

Legibility
A legible development is a place that is easy to understand. Urban Designer Kevin Lynch identified five features which create this kind of environment:

- Paths – the routes of movement such as alleys, streets and railways.
- Nodes – focal places such as roundabouts and market squares which connect the paths and roads.
- Landmarks – buildings or places that provide local character and act as reference points.
- Districts – areas of the city with distinct or recognizable characteristics such as the business district.
- Edges – linear elements not used as routes like busy roads, walls of buildings and railway lines.

Light Rail Transit (LRT)
Streetcar trains (up to three or four cars per train) operating on protected rights-of-way adjacent to or in the medians of roadways or rail rights-of-way. Generally at-grade, possibly with some sections operating in mixed-traffic and/or in tunnels. Electric power is normally via an overhead trolley or pantograph. Capacity of 2,000 to 10,000 passengers per hour in the peak direction, with higher capacities where there are significant stretches of completely segregated rights-of-way. Average speed: 15 to 35 km/h depending on station spacing and extent of grade separation. Examples: Calgary and Edmonton LRT systems.

Local bus
Conventional bus service typically operated by a municipality with frequent stops and connections to surrounding communities.

Long-term bicycle parking/storage
Bicycle parking intended for long-term use (overnight or longer). Due to the fact that bicycles are stored for a lengthy duration, there is a greater need for security and weather-protection. Long term storage options may therefore include attended facilities, racks in enclosed and lockable rooms, indoor or outdoor bicycle lockers, or restricted-access parking facilities. Such facilities are often centrally-located, allowing seamless access to transit and related services.

Main Street
Main Streets contain a range of street-oriented uses including, retail, cultural, institutional, residential, personal services, and employment.

Minimum density threshold
A minimum density threshold is a zoning tool that specifies the minimum allowable development density or floor area ratio, instead of the traditional approach to regulating maximum densities. This encourages compact development.

Mobility hub
Major transit station areas, as defined in the Growth Plan for the Greater Golden Horseshoe, that are particularly significant given the level of transit service that is planned for them and the development potential around them. They are places of connectivity between regional rapid transit services, and also places where different modes of transportation, from walking to high-speed rail, come together seamlessly. They have, or are planned to have an attractive, intensive concentration of employment, living, shopping and enjoyment around a major transit station. To be identified as a mobility hub, a major transit station area must be located at the interchange of two or more current or planned regional rapid transit lines as identified in the RTP, and be forecasted in the RTP to have 4,500 or more combined boardings and alightings in the morning peak period in 2031. In addition, these areas are generally forecasted to achieve or have the potential to achieve a minimum density of approximately 10,000 people and jobs within an 800 metre radius. The primary major transit station area associated with an urban growth centre are also identified as mobility hubs, as are Pearson Airport and Union Station due to their roles as the GTHA's primary international gateways. (For more information see the backgrounder "Mobility Hubs, December 2008").

Mode share
Trips taken by a particular mobility choice, such as car, transit, cycling, or walking as a proportion of the total number of trips.

Multi-modal streets
Multi-modal streets provide for and balance the needs of different travel modes: pedestrians, cyclists, transit riders, motorists and others. Transportation choice is increased when safe and appealing options for getting from place to place are provided - options to walk and bike provide opportunities for increased community health and reductions in air and noise pollution. Multi-modal streets are part of a network of streets, bicycle paths and walkways with plenty of high quality pedestrian amenities.

Non-market housing
Non-market housing or affordable housing provides housing mainly for those who cannot afford to pay market rents. It includes privately owned housing with rental units that are subsidized by the government through rental subsidy programs. Non-market housing is designed for independent living. This is in contrast to special needs residential facilities. These provide not only shelter, but also supervision, support or care for the residents. Some projects include both non-market housing and special needs units.

Park and Ride
Park and Rides are car parking lots that offer transit users a place to park their car, then transfer to a public transit service to complete their journey. They are typically

used in suburban locations where distances from destinations to transit service are further. Park and ride facilities should be visible from and located along heavily used commuter routes. They should be landscaped, weather resistant, well-lit, and contain a range of amenities.

Passenger Pick-up and Drop-off (PPUDO)
Also known as Kiss and Ride, PPUDO areas are the locations where customers access the transit station as a passenger in a car or taxi.

Pedestrian plaza
A public space that can act as important organizing elements within a station area, helping to facilitate transfers between modes, acting as receiving points for pedestrians and containing a range of services and amenities for transit users.

Pedestrian spine
Main circulation path for pedestrians in a station area that provides direct and safe access to station entrances to surrounding station amenities and community linkages.

Pedestrian thru zone
Sidewalks are comprised of four zones: curb, furnishings, pedestrian, and frontage. The curb zone abuts the street and provides a buffer between the sidewalk and the street. The furnishings zone lies between the curb zone and pedestrian thru zone, and provides a location for street furniture and other amenities such as trash receptacles, bicycle racks, and lighting. The pedestrian thru zone is the sidewalk space for walking and is located between the furnishings zone and the frontage zone. The pedestrian thru zone should be clear of obstructions at all times. Finally, the frontage zone provides a transition between the building or property line and the pedestrian thru zone. The frontage zone may feature furniture and act as a patio.

Permeability
The degree to which pedestrians can see inside or physically enter buildings or sites. A permeable façade or site helps create a more animated and safe environment.

Placemaking
Placemaking is a term that began to be used in the 1970s by architects and planners to describe the process of creating squares, plazas, parks, streets and waterfronts that will attract people because they are pleasurable or interesting.

Proof-of-payment system
In proof-of-payment systems, drivers are not responsible for collecting and inspecting fares. Instead, fare inspectors randomly check passenger transit tickets, passes and transfer stubs, and issue fines to those who do not present them. Proof-of-payment systems speed up boarding and reduce dwell times.

Public amenities
Public amenities are resources, conveniences, facilities or benefits continuously offered to the general public for their use and/or enjoyment, with or without charge (e.g., restrooms, information displays, public telephones, rain shelters, drinking fountains, etc.).

As such, public amenities are expected to function around the clock, in adverse conditions such as inclement weather, high noise environments and in varying degrees of light and heat. Consequently, there are several key attributes that should be integrated into all public amenities to ensure universal usability.

Public Private Partnerships (PPP)
Public–private partnership (PPP) describes a government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies. These schemes are sometimes referred to as PPP or P3.

PPP involves a contract between a public-sector authority and a private party, in which the private party provides a public service or project and assumes substantial financial, technical and operational risk in the project. In some types of PPP, the cost of using the service is borne exclusively by the users of the service and not by the taxpayer. In other types (notably the private finance initiative), capital investment is made by the private sector on the strength of a contract with government to provide agreed services and the cost of providing the service is borne wholly or in part by the government. Government contributions to a PPP may also be in kind (notably the transfer of existing assets). In projects that are aimed at creating public goods like in the infrastructure sector, the government may provide a capital subsidy in the form of a one-time grant, so as to make it more attractive to the private investors. In some other cases, the government may support the project by providing revenue subsidies, including tax breaks or by providing guaranteed annual revenues for a fixed period.

PPP involves many models including Design Build Finance (DBF), Design Build Finance Maintain (DBFM).

Public realm
The public realm consists of public spaces such as streets, parks and sidewalks. The public realm is also a place where the community can come together through collaborative activities such as street festivals and other programmable activity.

Queue jump lanes
Short roadway lanes provided on the approaches to signalized intersections which allow buses or cyclists to by-pass queued traffic and enter the intersection before other traffic when the traffic light turns green.

Real-time trip planning information
Real-time trip planning information reflects travel conditions as they actually occur. To achieve this, vehicle location and expected travel times must be updated every few minutes or seconds.

Regional bus
Longer distance bus services providing interregional or inter-municipal travel.

Regional coach services
Inter-regional and inter-city bus services typically operated using larger, coach style buses.

Reurbanization
Reurbanization can take the form of infill, intensification, adaptive reuse, or redevelopment. Reurbanization can occur in different sizes and intensities; from a one or two unit addition on a single lot to a multi-unit redevelopment of an entire city block or a redevelopment of a large brown or grey-field site. The benefits of reurbanization include greater housing choice and improved affordability, enhanced protection of sensitive agricultural lands and environmental features, reduced capital expenditures, and reduced need for costly infrastructure upgrades. Reurbanization often includes reintroducing a network of streets and blocks where they have previously been missing.

Right-of-way
Land that is reserved, usually through legal designation, for transportation and/or utility purposes, such as for a trail, hydro corridor, rail line, street or highway. A right-of-way is often reserved for the maintenance or expansion of existing services.

Road diet
The reconfiguring of existing road space, generally where capacity is substantially above demand, to improve safety and mobility for road users and providing an improved walking and cycling environment.

Screening
Landscaping can be used as a strategy to "screen" or mask parking lots or other visually unappealing elements of the urban landscape.

Semi-public amenities
The semi-public area is the zone that extends from the edge of the building to the public sidewalk outside the public right-of-way but accessible to the public. Gardens, fountains, seating areas, and kiosks with small outdoor dining areas are all types of semi-public amenities to consider for this zone - these may be closed or cordoned off during certain hours.

Sharrows
A short-form term for "shared lane pavement marking". This pavement marking comprises a bicycle symbol and two white chevrons, commonly used in curb lanes, either adjacent to the curb or parked cars.

Sharrows can also be painted in the middle of narrow lanes where there is not enough room for a cyclist and motorist to travel side-by-side or through intersections and areas where traffic merges, such as at highway on-ramps or intersections with multiple turning lanes. Sharrows indicate lanes that are shared by motorists and cyclists; unlike bike lanes, they do not indicate a dedicated cyclist-only lane and parked vehicles are allowed to cover sharrow markings for part of the day. Sharrows are simply used to remind drivers to share the road by reducing their speed when passing a cyclist and watching for cyclists when making lane changes or turns.

Sense of place
Though sense of place has been defined differently and used in different ways, It is often used in relation to characteristics that make a place special or unique, as well as to those that foster a sense of authentic human attachment and belonging.

Smart growth
Smart growth refers to a collection of land use and development principles that aim to enhance our quality of life, preserve the natural environment, and save money over time. Smart growth principles ensure that growth is fiscally, environmentally and socially responsible and recognizes the connections between development and quality of life. Smart growth enhances and completes communities by placing priority on infill, redevelopment, and densification strategies.

Spill-out space
Spill-out space refers to the area between the building or property line and the pedestrian thru zone. Spill-out spaces often allows restaurants and cafes to provide outdoor seating for their customers.

Street grid network
The grid plan, street grid plan or gridiron plan is a type of city plan in which streets run at right angles to each other, forming a grid. These patterns display a higher degree of connectivity than other road hierarchical road patterns that feature dead-end streets and fewer through connections.

Streetscapes
The visual elements of a street, including the road, adjoining buildings, street furniture, trees and open spaces, etc, that combine to form the street's character.

Structured parking
Structured parking refers to an above- or below-grade structure designed to accommodate vehicle parking. This type of parking is more expensive than surface parking, but is a much more efficient use of land (a 3-storey parking structure requires a third as much land as a surface lot) and has long term value of integrated mixed-use development.

Tax Increment Financing (TIF)
TIF is a method to use future gains in taxes to finance current improvements (which theoretically will create the conditions for those future gains). When a development or public project is carried out, there is often an increase in the value of surrounding real estate, and perhaps new investment. This increased site value and investment sometimes generates increased tax revenues. The increased tax revenues are the "tax increment." Tax Increment Financing dedicates tax increments within a certain defined district to finance debt issued to pay for the project. TIF is designed to channel funding toward improvements in distressed or underdeveloped areas where development might not otherwise occur. TIF creates funding for "public" projects that may otherwise be unaffordable to localities, by borrowing against future property tax revenues.

Timed transfers
When two or more connecting transit services arrive and depart a transfer point at the same time to minimize customer waiting time.

Traffic calming
Traffic calming is intended to slow or reduce motor-vehicle traffic in order to improve safety for pedestrians and bicyclists and improve the environment for residents. These may include, narrower traffic lanes, speed bumps, raised pedestrian crossings, pedestrian refuge islands in medians amongst others.

Transit Adjacent Development (TAD)
Development that is in close proximity to transit stops or facilities. However, this type of development is not designed to promote transit ridership. A TAD lacks functional connectivity to transit, whether in terms of land-use composition, station access, or site design.

Transit-oriented Developments (TOD)
Transit-oriented developments (TOD) are 'urban villages' where all residents are within a 5-10 minute walk of quick, efficient public transit and can 'live, work, play, shop and learn' in a pedestrian-friendly environment – without the need of a car. TOD is a planning approach that calls for high-density, mixed-use business/residential neighbourhood centers to be clustered around transit stations and corridors. TOD is considered a "smart growth" strategy, because it addresses the issue of where growth should occur from a sustainability perspective and it coordinates land use and transportation such that both land and infrastructure are used efficiently. As its name implies, TOD is designed to be served by transit rather than or in addition to the automobile. Networks of streets and multi-use paths are also created to provide a walkable and bikeable environment that is conducive to living, working, and shopping in the same area. TOD is focused within a 800m radius of transit stops, with the highest intensity and mix of land uses concentrated within 400 m or adjacent to the station. Land use intensities and densities decrease away from the core area, with transitions included in development plans to ensure compatibility with existing neighbourhoods.

Peter Calthorpe summarizes the main characteristics and goals of TOD as follows:

1. Organize growth on a regional level to be compact and transit-supportive.
2. Place commercial, housing, jobs, parks, and civic uses within walking distance of transit stops.
3. Create pedestrian-friendly street networks which directly connect local destinations.
4. Provide a mix of housing types, densities, and costs.
5. Preserve sensitive habitat, riparian zones, and high quality open spaces.
6. Make public spaces the focus of building orientation and neighbourhood activity.
7. Encourage infill and redevelopment along transit corridors within existing neighbourhoods.

Transit priority signals
Traffic signal priority allows transit vehicles to travel through signalized intersections with little or no delay. Since transit vehicles hold many people, giving priority to transit can potentially increase the person throughput of an intersection. There are different types of signal priority: passive, active, and real-time. A passive priority strategy uses timed coordinated signals in the area-wide traffic signal timing scheme. An active priority strategy involves detecting the presence of a transit vehicle and gives the transit vehicle special treatment. The system can give an early green signal or hold a green signal that is already displaying. Real-time control strategies can consider not only the presence of a transit vehicle but the adherence to schedule and the volume of other traffic. One common strategy is to give priority only to late buses but not to early buses. This strategy optimizes schedule adherence (and therefore waiting time) rather than running time.

'Transit-supportive'
Makes transit viable and improves the quality of the experience of using transit. When used in reference to development, it often refers to compact, mixed-use development that has a high level of employment and residential densities to support frequent transit service. When used in reference to urban design, it often refers to design principles that make development more accessible for transit users, such as roads laid out in a grid network rather than a discontinuous network; pedestrian-friendly built environment along roads to encourage walking to transit; reduced setbacks and placing parking at the sides/rear of buildings; and improved access between arterial roads and interior blocks in residential areas.

Transportation Demand Management (TDM)
A program of incentives which influence whether, when, where and how people travel, and encourage them to make more efficient use of the transportation system.

Trips per capita
Number of trips proportional to the population of the municipality or service area.

Ultimate urban boundaries
The ultimate urban boundary of an urban area is the boundary between the areas which are designated for future urban development and the areas that are preserved for rural uses over the long-term (i.e. the next 30 years, or longer).

Urban boundaries
An urban boundary is set in an attempt to restrict growth and preserve countryside lands including agricultural and environmentally sensitive areas. An urban growth boundary circumscribes an entire urbanized area and is used by governments as a guide to zoning and land use decisions. In a rural context, the terms town boundary, village curtilage or village envelope may be used to apply the same constraining principles.

Urban Design
A key tool for good urban form and placemaking. Urban design involves attention to elements such as site-specific design, streetscape and parking lot design, public safety and accessibility, heritage areas, and infill, among others. Many municipalities throughout the GTHA have various urban design guidelines, from district or area-based guidelines to city-wide guidelines that help to direct and implement desired outcomes. In regards to the mobility hub context, urban design is an important component to ensure vibrant and accessible station areas.

Urban Growth Centres (UGC)
Centres designated in the provincial Growth Plan for the Greater Golden Horseshoe, 2006. The Growth Plan designates 25 UGCs in the Greater Golden Horseshoe, of which 17 are in the GTHA.

Vertical circulation
Movement up or down between different levels of a facility, facilitated by either stairs, escalators, ramps, or elevators.

Wayfinding
The means in which people orient themselves in physical space and navigate from place to place. Can include the physical design of spaces and assistive features, such as signage.

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